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The Dental Digest

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THE DENTAL DIGEST

VOLUME XXXVII NOVEMBER, 1931 NUMBER 11

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THE DENTAL DIGEST

GEORGE WOOD CLAPP, D.D.S., EDITOR

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THE DENTAL DIGEST

VOLUME XXXVII NOVEMBER, 1931 NUMBER 11

The Necessity for a Complete Diagnostic Survey Before Instituting Dental Treatment

By LOUIS A. UNGAR, D.D.S., New York, N. Y.

One of the most noteworthy advances in the conservation of health has been the discovery of the strategic importance of good oral and dental health. Recent years of investigation have demonstrated beyond doubt that insidious infections in the mouth may give rise to various and serious constitutional disturbances. Conversely, it is recognized that certain of the general infectious diseases produce characteristic lesions in the mouth. Upon correct diagnosis of such mouth conditions often depends the bodily well-being of the individual.

Problems such as these challenge the dental profession to efforts never before encompassed in the scope of dentistry. Dentistry as the art of tooth-pulling has long since become obsolete. The dentist of the present and of the future must be prepared to shoulder full responsibility in prevention and therapy, as he has already done in mechanical restoration.

It is no longer sufficient for the dentist to be a perfect mechanician. He must be skilled also in the detection of every possible factor in the oral cavity which might jeopardize his patient, so that he may remove or minimize the cause before the ill effects have gained such headway as to do irreparable damage. As a dental physician his efforts will be directed along four converging paths: to diagnose, to heal, to restore and to prevent. Their common meeting-point will be the preservation of the patient's health.

The practical application of these newer principles of dentistry depends upon several factors. The scope of dental education must be enlarged to meet the present-day demands upon dentistry for consideration of the health of the body as a whole and of the neglected mouth as the point of ingress for serious disease. Medical curricula must be revised to enable the physician to secure adequate knowledge of the interrelationship between mouth health and general health. There must be increased cooperation between the dentist and the patient's physician.

The patient himself must be made to recognize the necessity for thorough and frequent repair, as well as constant prophylaxis. The practicing dentist must be prevailed upon to assume his larger responsibility in the patient's health by refusing to render any but a complete and careful diagnosis before proceeding with reparative measures.

In this present paper I am concerned with only the last two of these factors: (1) the education of the patient to a

better appreciation of the value of mouth hygiene, and (2) a presentation of practical methods for more careful diagnosis, once the patient has sought the dentist's assistance.

Control of Health Through the Mouth

Joseph Colt Bloodgood, M.D., of Johns Hopkins University, has observed that bad teeth are the most common cause of all ailments.

Much has already been done to acquaint the public with the value of a healthy mouth. Thus the relation between chronic infectious arthritis and dental infection is now widely known even by the laity. Cecil, of the Cornell Clinic in New York, has remarked on the frequency with which arthritic patients come to the Clinic already prepared with x-rays of their teeth.

However, the relationship between the teeth and ill health is less widely appreciated in other diseases. Among these may be mentioned bronchiectasis and abscess of the lung, induced by intratracheal injection of fusiform and spirochetal infection from the teeth. Experimental evidence suggests also a direct relation between gastric and duodenal ulcers and streptococcal focal infection in the mouth and teeth.

Iritis and uveitis in nearly 50 per cent of cases have been found contingent upon dental infection as a causative factor. Primary foci of infection in the mouth may occasion gall-bladder disease, appendicial abscess and secondary infections of the heart and kidneys. Various diseases of the nervous system are known to have a possible relationship with dental infection.

Of the systemic diseases which have definite oral manifestations there may be mentioned as many as a dozen and a half acute and chronic afflictions which may frequently be brought to correct diagnosis from observation of the condition of the mouth. Among them may be enumerated syphilis, tuberculosis, actinomycosis, scurvy, rickets, pernicious anemia and leukemia. The early mouth lesions in such acute diseases as diphtheria, scarlet fever and measles are more widely recognized.

From as brief a survey as this one may judge the magnitude of the relationship between thorough diagnosis of mouth and teeth conditions and the conservation of health. "The day is coming," quoting Bloodgood again, "when more lives will be saved by keeping the people's mouths clean than by doing bridgework. The preventive measures of dentistry are tremendous."

The unfortunate rôle of an unclean mouth as a portal of entry for disease germs may be deduced from the experimental studies of Professors Gies and Kilger, of Columbia University. They have calculated that one milligram of tooth scrapings from a fairly clean mouth contains 5,000,000 bacteria, while one milligram of tooth scrapings from a dirty mouth contains from 500,000,000 to 800,000,000 bacteria. Hence it will readily be seen how a tooth cavity or a break in the other tissues of the mouth may become an entry of deadly infection, with the ever-present danger that the blood stream may carry the infection to vital parts of the body.

IMPORTANCE OF COMPLETE DIAGNOSIS

The most severe criticism that has been raised against the dental profession is that it frequently fails to utilize the ordinary diagnostic methods which are easily available. In consequence, wrong therapeutic procedures may be utilized and contributing factors important to the patient's welfare overlooked.

In my own practice I make it an inviolable rule under no circumstances to attempt to treat a patient without a complete diagnostic examination. To obtain a true clinical picture, I utilize all the known diagnostic procedures in accepted present-day usage.

The problem arises of how to secure the patient's consent to a satisfactorily complete diagnostic examination. My personal way of solving it has been to have a preliminary talk with my prospective patient to acquaint him with my method of procedure and explain to him, in terms of his own health, why I insist upon the diagnostic examination.

I do not leave the decision to the patient as to whether or not he shall have the examination. I have established a flat fee for my examination, which is payable at the time of the examination. After I have made a diagnosis, I present two plans of restoration or treatment for the patient's choice, listing each individual operation in the order of its importance, as well as just what each item will cost.

If the patient accepts either of the plans, I credit the charge for his examination against the cost of the course of therapeutic procedure. In other words, the examination will then cost him nothing. If the patient is disinclined for any reason whatsoever to allow me to proceed, he is under no further obligation to me. This diagnostic schedule is fully explained to the patient when he first presents at my office.

The gist of my introductory talk to prospective patients may be of interest to other dentists who have similar problems of educating the patient to an understanding of the necessity for a thorough diagnosis.

"I am going to take just a few minutes," I tell my patient, "to explain the routine of my office. It will have to be done only once, and my sixteen years of experience have taught me that, when a thorough understanding is established from the start, it will avoid any doubts you may have now or later.

"The most important thing in dentistry, as in medical practice, is first to locate the cause of the trouble. No dentist can honestly say he can give you good dental service without knowing what is the matter. That is reasonable, isn't it? The only way he can determine what he should do is to make a complete and thorough examination of your mouth and teeth. The only way I can correct your mouth condition is to locate *all* the trouble first, then carefully plan the very best way to restore or treat your teeth.

"A building can be no better than its foundation. Neither can dentistry. It is my practice never to attempt dental work with a patient unless I am permitted to make a thorough examination of all his teeth by x-ray and the other methods which dentists use to find out just how healthy or unhealthy the teeth and gums are. Such an examina-

tion permits me to ascertain the condition of the dental work already done. Secondly, it enables me to observe the condition of each individual tooth. Thirdly, it enables me to work out a careful plan of the best way to proceed, before I start work."

I then explain my established practice with regard to fees and appointments. With regard to the charge for the preliminary examination I take pains to explain to him that such a plan of payment relieves him of all embarrassment, because he is under no further obligation to me should he decline to utilize either of the two corrective programs that I submit to him.

Requirements for a Correct Diagnosis

The criteria of a satisfactory diagnostic procedure must include, in brief, examination of:

(1) The mouth cavity itself—cheeks, tongue, floor and roof, lymphatics, salivary glands, saliva, odor of the breath.
(2) The gums and mucosa.
(3) The gingival border.
(4) The periodontal tissues.
(5) The presence of calculi or tartar.
(6) The condition of each tooth by x-ray, thermal, transillumination and pulp-testing methods.

In the examination of the tissues of the mouth, resort to biopsy of bone or tissue is often indispensable for rendering a diagnosis of abnormal conditions. When suppuration and sloughing are present, the diagnostician must be alert to recognize neoplasms, tuberculosis or syphilis. The taking of cultures for microscopic examination should not be omitted.

Reliable laboratory reports must be utilized in the diagnostic regime. They should include urinalysis, blood count, coagulation and bleeding-time tests, and the Wassermann test. The superficial physical examination should entail use of both the stethoscope and the sphygmomanometer.

Examination of the teeth should entail percussion, palpation and roentgenograms of the entire dental arch. Many patients request, and dentists as well are satisfied with, only a partial roentgenographic examination of the place where they *think* the trouble may be. As the outward symptoms may be referred to a locality far removed from the definite lesion, such partial examination is useless in forming a definite diagnosis.

Every dentist is familiar with the patient who insists upon extraction of a certain tooth which he thinks is abscessed because it aches. The roentgenogram discloses that the adjoining tooth is the cause of the offending ache. Again, there is the patient who complains of pain on one side of his face the cause of which is located by the roentgenogram in a tooth in the opposite jaw. The conscientious dentist will not care to waste the patient's money with partial roentgenographic examination.

Radiography is useful in diagnosing osteolysis, osteomyelitis, impactions, malformations and fractures. However, resort must be made to transillumination for location of the presence and extent of congestion of the tissues in the earlier stages. The roentgenogram

will not disclose such early congestion, but it can be detected by transillumination as early as seventy-two hours after its inception.

Transillumination will be of inestimable value also in following the course of the congestion in its response to treatment and in disclosing anthrum sepsis.

Since pulpless teeth are invariably infected, it is extremely vital to health to locate all pulpless teeth so as to prevent and control this prolific source of bacterial invasion. The diagnostician will not fail to include in his equipment the newer electrical devices for pulp-testing or to utilize ethyl chlorid for the detection of so-called "dead" teeth.

I recognize fully the difficulty of the task with which the dentist is confronted when he undertakes to convert his patients to the program of nothing short of "the whole truth" about the vital question of the health of his mouth. It is often helpful to take the patient completely into your professional confidence. When you explain that a seemingly simple swelling on the face and neck may be a symptom of alveolar abscess, angioneurotic edema, tuberculosis, acromegalia, syphilis, neoplasm, osteomyelitis, lymphadenitis and a number of other serious complications, it is possible that he may more readily understand and welcome your insistence upon a careful differential diagnosis.

So far as the cost of such a thorough program is concerned, the initial expenditure in a careful survey is an investment. It may save him a heavy burden of future illness, loss of income through inability to work and the mounting costs of prolonged illness.

211 Central Park West

Some Things That Happen in Dental Decay

By ALFRED GYSI, D.D.S., Zurich, Switzerland

This article, like the one by Prof. Gysi in the October issue of THE DENTAL DIGEST, resulted from a conversation which we had during those long but delightful train-rides on his transcontinental lecture tour in 1928. It grew out of the presentation to Dr. Gysi of some of the conditions in this country with which professionally minded dentists are struggling and his conception of the application of the knowledge which might be applied to the solution of their problems. The character of the text indicates about what was said to him.

As always, Dr. Gysi supports his assertions with the evidence upon which they are founded. Only a few references to the many interesting stories with which his experience is crammed are possible here.—G. W. C.

We saw in the previous article that under optimum conditions each enamel rod is enclosed in a hornified sheath which is insoluble in any of the body fluids, and which, so long as optimum conditions obtain, is protective in a high degree.

That sheath is permeable, and Fish has shown that lymph circulation goes on within it, moving from the dentino-enamel junction outward. The direction of this flow, which is osmotic in character, is very important because it is probable that while it is continued in full force, osmosis in the opposite direction, by which alone caries is made possible, cannot occur unless there is a strong concentration of acid upon the enamel surface.

A very simple view of what occurs in caries would be about as follows:

Remnants of starch foods are attacked by bacteria, and acid is produced in intimate contact with the enamel surface and is protected from removal or dilution by the bacterial plaque. This acid penetrates through the enamel sheath and slightly demineralizes a tiny terminal area of some enamel prisms. If at this stage the acid is entirely removed and is replaced by saliva of optimum quality, the calcium-phosphorous compounds in solution in the saliva enter the enamel sheath, just as the acid did, and remineralization of the tiny zone takes place.

This is merely one expression of the continuous chemical warfare going on in the body between the forces of construction and those of destruction, in which health and life are held only by a slight superiority of the constructive forces. I believe that this partial demineralization and remineralization of shallow zones of enamel rods may recur thousands of times in the life-history of a tooth without our having any means of recognizing it clinically.

If the concentration of acid is too great or too long continued, or if there is not opposed to it a sufficient quantity of the constructive forces, the acid penetrates more deeply and more completely and more enamel salts are dissolved. This is what is pictured as happening on two adjoining surfaces of *A* in Fig. 1. It is probable that even yet the entire removal of the acid and the continuous bathing of the surface in saliva of optimum quality might result in a remineralization. The surface of enamel where such a change has taken place is still so hard that no indication of a cavity can be detected by an instru-

ment. In recent years there has grown up the practice of taking radiographs for the purpose of discovering cavities while they are too small for manual detection.

If the acid is not removed, however, the solution of enamel salts continues. And now a strange and interesting thing takes place. The direction of osmosis through the enamel, which is normally from within outward, is reversed in a cone-shaped area with its base on the enamel surface and its apex at the pulp. The mineral salts which are dissolved by the acid are not all washed out into the mouth. Some of them go inward toward the pulp and overmineralize the cone-shaped area, whose base is as wide as the area of enamel which is being decalcified. This overmineralized area, which is known as the *translucent zone of decay,* extends to the pulp, and over its inner end the pulp builds secondary dentin as a protection against the attack it anticipates.

Around this cone there is another overmineralized area of quite different origin. It is a defense mechanism, and the overmineralization is from the pulp. It differs also from the cone in that the calcification here is granular and shows dark by transmitted light, while the overmineralization of the cone is homogeneous and is clear by transmitted light (*B* in Fig. 1).

It is worthy of note that up to this time no bacteria have entered the tooth, not even at the outer surface of the enamel. All the changes have been wrought by the infiltration of the acids. The destruction so far is purely that resulting from chemical action.

If we examine the surface of the enamel at a slightly later stage of this process, we find that where the acid has permeated through the membrane and along the prism sheaths, it attacks the fully calcified portions of the enamel rods and forms a series of cones by the washing away of enamel salts from what might be called the *outer corners of the rods.* The outer membrane which covered the ends of the rods and the

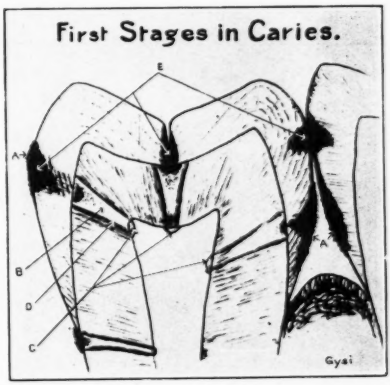

Fig. 1

A—Acid-forming bacteria on the enamel surface.
B—Translucent zone.
C—Secondary dentin as a pulp defense.
D—Overmineralized zone as a dentin defense.
E—Putrefaction bacteria entering the enamel.

portion of the sheaths which covered the area where the salts are gone then collapse and fall an easy victim to the putrefactive bacteria always present. Then, for the first time, the bacteria enter the depressions among the enamel rods and there continue acid production under more favorable conditions. This is really the beginning-point for real solution of the enamel.

In the previous article it was related that under optimum conditions the

enamel sheaths are of uniform thickness and uniformly and perfectly hornified, while under less than optimum conditions the enamel sheaths are thin in places and poorly hornified or not hornified at all. The practical significance of this to us is that the perfect enamel sheath is only slowly permeable to the acids which dissolve out the mineral salts, and this gives us, if we are alive to our possibilities, opportunities to assist the constructive forces. Where the enamel sheaths are not well hornified, there may be no such defense and we may have no such opportunity. The acids find immediate access to the enamel salts, and solution is rapid. Furthermore, it is probable that the perfect sheath forms part of the mechanism by which remineralization is effected, and it is possible that where the sheaths are poorly hornified or not hornified at all, remineralization of an area is not possible. Thus a tooth which might have repaired slight damage to itself a thousand times, and none of us would have been the wiser, may fall victim to an attack which under optimum conditions would have been ineffectual.

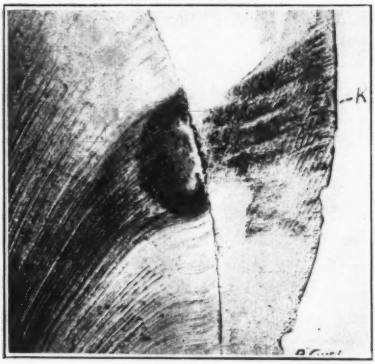

Fig. 2

Partly decalcified human enamel and dentin without cavity formation. Pulp reaction causes hypercalcification. Gram's stains—no microbes.

I have told you all this so that you may see these facts in relation to preventive dentistry, and because I want to tell you the story of how some people live who suffer very rarely from caries of the teeth.

Two classes of people come to us in Switzerland with nearly perfect teeth. They are the maids who come from the southern part of Germany and the laborers who come from certain parts of Italy. The teeth are usually all present, in perfect positions or nearly so and entirely free from decay, except perhaps where the accumulation of debris has pushed back the gum in such way as to make it possible for food remnants to lodge where the action of the food, tongue and cheeks will not remove it.

Both classes of people have grown up on what we moderns call a *primitive* diet. It consists of dark bread baked very hard so that it requires long and thorough mastication, of vegetables and fruits, many of them eaten raw. There are no refined or concentrated foods, so that refined sugars and white bread are unknown to them. The Italians, who have impressed themselves on my memory as having the finest teeth I have ever seen, come from those portions of Italy where much citrus is eaten. With us they are engaged in vigorous outdoor work, they live in colonies by themselves and they maintain their habitual food regimen.

Now note an interesting contrast.

The German maids enter domestic service in well-to-do homes. Very soon they are attracted by the diet of the family and, since refined foods have the devil's own fascination for us all, they are soon eating what the family eats. Within two or three years the resistance which characterized the mouth on the primitive diet is badly broken, the mouth begins to go to pieces and usually the ruin is soon complete. It thus often comes to pass that a lass who entered service at twenty-five years of age with a practically perfect set of teeth will at the age of thirty be edentulous. With the Italians it is not so. They stick to their diet, and their teeth stick to them, practically through life.

Forty years ago, on one of my holidays, I entered a little Swiss village which could be reached only by a long foot journey. The people there knew nothing about tea or coffee, about pianos or potatoes. They knew nothing about horses, because no horse could have gotten there. They lived on dried prunes, dried meat, hard bread, milk and cheese. They may possibly have had a little sugar from Italy during the summer months when they could get out over the mountains and bring it in on their backs, but this must have been rare and it could not have been refined sugar as we know it now. The school teacher there told me that such a thing as the loss of a tooth was unknown, and that all the old people were buried with all their teeth.

In the Canton of Wallis there are today two villages on opposite sides of a river. In one there is a bakery where fresh bread is offered every day. In the other village the old custom of a community bakery, available to each family at intervals, still prevails. In the fresh-bread village decay of the teeth is rampant; in the other village it is but little known.

I have told you these facts and stories because on this trip through America I have seen such a display of wealth as I have never seen anywhere else in the world, and because you tell me that among the young people decay is prevalent on a really terrible scale, and that it appears to be increasing. Wealth and what we call civilization bring their penalties, and too much refinement is one road to death.

You say that your dentists generally recognize that reparative dentistry erects no barriers against the recurrence of decay tomorrow, and that they are concerned to learn what they can do to prevent decay and deformity.

Everywhere, so far as I know, and in all the time of which I can learn, the extensive use of refined foods has caused dental decay. They displace the unrefined foods by taking their place or destroying the taste for them, they do not provide the mineral salts which are essential to dental health, and the debris which they leave about the teeth provides ideal pabulum for the acid-producing bacteria. These foods might do no harm if they were added to a sufficient quantity of unrefined foods, but this seems to be impracticable for two reasons: (1) if they are eaten first, one does not want the unrefined foods; and (2) if enough of the unrefined foods are eaten, there is neither room nor appetite for the enjoyment of those which so intrigue the educated taste.

Among the fruits the citrus fruits appear to be especially valuable. The fruit acids they contain are destructive

to mucus either by solution or by precipitation, they prevent excessive fermentation, and the fruits contain considerable quantities of mineral salts with vitamins and of unrefined sugars in forms peculiarly assimilable by the body.

You tell me that sometimes dentists can get intelligent and effective cooperation from physicians well informed on the subject of nutrition and diet, but that in some communities such cooperation is impossible. It does not seem to me to be difficult for any dentist to master the relatively simple laws of nutrition and suggest that within these laws patients should select what they like best and find most beneficial. If such education is carried on long enough, it should not be impossible to produce a large number of people who, like the old folks in the inaccessible Alpine hamlet, "should be buried with all their teeth."

To the Members of the American Dental Association

Gentlemen:

We are approaching the Christmas season, at which time we are supposed to open our hearts and extend good cheer to all who need it. One of the simplest methods of doing good along these lines is to purchase Christmas Seals. You will shortly receive a package containing 100 seals, for which you are asked to pay the small sum of $1.00.

It is an astonishing fact that for the past ten years only about two-fifths of the members have responded to this appeal. It is astonishing because dentists as a rule are neither stingy nor selfish. Probably the truth is that procrastination is the explanation, so this year please send $1.00 (or $5.00 or $10.00) just as soon as you receive the seals.

I feel that it is proper for me to inform the membership of the following fact. While so many men are neglecting this obligation to their needy colleagues, in all honor to one man let me report that Dr. James F. Moon of East Orange, N. J., has been sending me a check for $3.00 every month for the past year and a half. This makes Dr. Moon the largest individual contributor to the Fund. I feel that at least this public recognition is due him, and I trust that Dr. Moon's attitude may inspire others to support the Fund this season.

R. Ottolengui,
Chairman, Dental Relief Fund Committee,
American Dental Association.

The Equitable Service Distribution Plan

By ALFRED J. ASGIS, Sc.B., M.A., D.D.S., F.A.S.S., New York, N. Y.

IV

THE COOPERATIVE GROUP SYSTEM OF CENTRALIZATION OF DEMAND AND SUPPLY

State dentistry in various forms is in operation in European countries and is now being proposed as a solution for the cumbersome situation in medical and dental care in the United States. It is claimed to be a system where adequate scientific dental (and medical) care can be provided for the masses at a fee within their reach. Other solutions offered have been (1) state dentistry, (2) philanthropic dentistry (charity service), (3) preventive dentistry, (4) level dentistry, (5) cooperative dentistry, (6) insurance dentistry.

At the other extreme from state or completely socialized dentistry we have the present so-called *private practice system*. We no longer need to point out that the present system has lived its day. It has failed in more than one respect. If continued much longer, it will carry the present partial dental bankruptcy to complete financial ruin.

In this paper it is not our purpose to discuss the merits or demerits of socialization of dentistry or state control of dental care, but we do wish to point out some features common to all non-private systems. We shall therefore attempt to show (*a*) that the cooperative group system of dental practice offers us all the advantages inherent in all the solutions so far proposed, and (*b*) that it promises a sort of guarantee that the interests of the profession under this system cannot be jeopardized, as may be the case under the other plans.

What are the defects of the private practice system? They are as follows:

(1) Effective demand may be lower than supply.

(2) The individual practitioner has no means of securing directly effective demand.

(3) Seemingly high cost diverts demand from the dental practitioner, due to unfair competition.

(4) Questionable quality (lack of public confidence) of private dental service.

We find in the recent innovation of the "pay" dental clinic which is coming on the dental horizon a means (1) to reduce the cost of dental care and (2) to guarantee, so to speak, the quality of dental service. More important, however, are the features of the clinic system (which appears under the assumed position of a socialized service,

which it is not) which come under state dentistry and philanthropic dentistry. The organized corporation is in a position to balance supply scientifically and to adjust it to meet the demand. Besides, it has the means of attracting demand in ways not at the disposal of the private practitioner. The advantages of the clinic system over the private practice system, as far as the reduction of cost is concerned, lie chiefly in centralization of demand, to which is adjusted its plan of centralization of supply. The question is: Why cannot dental practitioners make use of this principle of centralization? The answer is: The centralization principle is not applicable to the private practice system; it is applicable only to a system such as we propose—a cooperative group system.

The next question that arises is: Wherein lie the advantages of the group system over the other forms of service or plans hitherto proposed? The answer lies in our interpretation of the meaning of *cost*. In all computations the overhead may be considered fixed. If we do away with profit, as is supposedly the case under the state and corporate clinic systems, this may be so. The fees are thus established in accordance with this formula. Under the cooperative group system the salary is taken as a standard in establishing the minimum fee scale. Economies in overhead may be employed under group systems by the centralization of supply.

With these factors taken into consideration, how can the clinic sell its services at a lower fee than a dental group could? How can the clinic reduce its *cost* below that of the group? It cannot. Only by lowering the salaries of employed dentists is it possible for the clinic to operate as a business enterprise. Such a system accomplishes that at the expense of the dentist's well-being. This is not a solution but an evasion of the problem. It is in place to record that the hourly overhead in such corporate institutions is not lower than the hourly overhead in the present inefficiently managed private dental practice. Dr. Westby, head of the Industrial Clinic in Chicago, made the following statement in an address before the Chicago Dental Society:

"The overhead per hour for operating our clinic averages $5.00. When we first started our clinic, some of our patients objected to our fees, often maintaining that the same operations were performed by neighboring dentists for less money. Knowing our overhead to be economically sound, we came to the conclusion that these practitioners either were slighting their work by hurrying through operations or else were performing some operations at an actual loss."

We see, then, that the "pay" dental clinic or the other solutions have brought us no nearer to a solution of the broad dental economic problem than we were before. If the pay dental clinic cannot reduce the cost of dental services (and we have shown that it cannot and does not), then it faces the same problem as the private dental practitioner. We are still face to face with the same issue of high cost. The reason why these solutions are palliative is because they overlook two important factors: (1) the need of translating the present needs of dental care (as distinct from dental health) into an effective and permanent demand, and (2)

the increase of consumption by improved methods for the increase of the purchasing power of the people.

The plan that may be made operative under the cooperative group system has two distinct units of activity. The unit of centralization of supply is the cooperative dental group. The unit of centralization of demand is the group diagnostic center. The group as a whole "pools," so to speak, all of its unemployed time and submits its quota to the central diagnostic service for sale at cost (no profit) to the public. It is a very simple matter for a group of 15 or 25 practitioners to determine its unemployed time, in terms of hours, which it is ready to supply to the public. The group may render dental care either under one roof (if further economies are desirable such as are possible by having a common reception room, several operating rooms on the same floor, common x-ray apparatus, dental laboratory, etc.) or separately in their own private offices. The method employed in the distribution of demand among the group may be the same as is operative in those countries where private practice is carried on alongside insurance practice. Modifications suitable to American conditions and the group system may be made as time requires. The group provides central supervision also. This insures the public a definite quality of the services rendered. It also provides an opportunity for the patient to obtain full value for the money spent for dental care and to register approval or dissatisfaction with the services of members of the group. It enables the practitioner to furnish all of his unemployed time to the group at cost. The minimum fee scale of the group is established on the basis of a professional standard of living and the average expenditures of local overhead. With the increase in the volume of business the fee scale may be modified so as to reduce the fees and adjust them accordingly. Guided by the minimum fee scale, a sliding fee scale may be established. In the course of time a standard fee may be established.

According to Dr. Davis, the potential demand may be translated into effective demand by education. He maintains also that the high fees must be reduced, and this may be accomplished through the clinic system. The cooperative group system, as was shown, has the additional advantage over the clinic plan that each practitioner of the group takes an interest in his group patients. Through the medium of a central diagnostic service the group is enabled to carry out an effective educational publicity campaign for the enlightenment of the public. This type of education has the advantage over the traditional kind of publicity carried out by scientific dentistry in that it is more than merely information-giving, as is the case with scientific dental campaigns. It aims at reaching directly those in need of service. The group thus derives the full benefit of its educational effort and turns it into public service.

When we realize that 80% of the population is in need of dental care, why cannot the dental profession add to its present source of income from dental cripples (for the 20% who are compelled to visit the dentist for one reason or another are virtually that) the additional benefit of rendering a complete

dental service to this part of the population? Why is it not possible to take care of the other 80% under a suitable plan and see that they are kept in the condition of good oral health? Under the cooperative group system, setting the equitable service distribution plan in operation, it is possible to sell a complete annual dental service on a basis that will be within reach of persons with an average income.

In order to make such service available to the middle class, it must be made accessible to them. This necessitates the application of the insurance principle to dental care. By that is meant the apportionment of cost over a period of time and provision for its anticipation, which is not the case today. In other words, it is imperative to place the cost for dental care on a budget basis and make it part of the family budget. I pointed this out in 1928 in an address before the First District Dental Society, New York.[15] Some time ago I showed that the solution of the dental health problem for the people as a whole lies in this direction.[16] It has been estimated that 7c. per day per person will provide a complete dental service and will at the same time be equitable to the dentist and yield him a satisfactory net income for his unemployed time. Twenty-five dollars per year for a period of ten years, if we wish to estimate it for a longer period, will accomplish for the patient much more in terms of conservation of dental health than $250.00 spent for dental crutches. If, as has been estimated in a survey on community dental service in the City of New York, approximately 500 or 400 patients can be taken care of by one dentist, it is apparent that in a group of 10 practitioners, with the economies possible in a collective capacity under the above-described plan of centralization of demand, the dentist would receive for his unemployed time approximately $5,000 net annually.

The question may be raised: Has the cooperative group system been tried before and found workable and practical? In dentistry the group system has not been tried extensively. The more worth-while type of group-practice experiment may be observed in the Dental Department of the Union Health Center in New York, under the direction of Dr. Max Price. I was afforded the privilege of examining some of the records to find out whether or not the institution could provide us with more useful information than has hitherto been made accessible to the profession. It is to be regretted that so little is known to the outside world of the activities of this service and how the experiences of that institution may be utilized for the good of the profession in solving our broad economic problems.

It is interesting to note that the total income for the year 1930 in the Union Dental Health Center was $94,430, of which $46,000 (about 50% of the total gross income) was spent for dentists' salaries. Here is an illustration of the application of the centralization principle. I examined the fee scale, which compares very favorably with another fee scale by a dental health service in New York which was designed apparently for the poor and needy. I understand that the policy of the Union Health Center Dental Department is

to establish its scale of fees on the principle of rendering service at cost.

While experimentation with the cooperative group plan in dentistry may be considered negligible, in medicine much has already been accomplished. The following data from a recent report by the Committee on the Costs of Medical Care are indeed illuminating. At the present time there are approximately 150 groups or so-called private group clinics. In this study about 77 groups were covered. Four of these groups were established before 1918, twenty from 1918 to 1923, and six from 1923 to 1928. In the 155 groups about 1500 to 2000 physicians and dentists are engaged in practice.

These groups are studying their common problems, and their directors are organized under the Association of Clinical Managers.[17] The years of practice of physicians and dentists in these groups are, on the average, twelve. In the 50 private-group clinics the total number of practitioners is 601, of which number 578 are physicians and 23 dentists. The average number of practitioners per group is from 6 to 15. Of the 19 dentists 12 are in the median of years in practice. Of these 12 dentists, taken individually, the average years of dental experience range from 7 to 18. Dentistry is represented in all these groups by 3.8% of the total number of practitioners. More and more are dentists joining the medical group movement. It is interesting to observe that of the forty groups who reported on the "Standard Fees for Annual Medical Service" 10 have flat rates, that is, agreements with industrial organizations for annual medical service. Some arrange for monthly payments for whole groups of workers. Why is it not possible for the cooperative dental groups to enlist the cooperation of welfare societies, banking institutions, workers' organizations, industrial organizations, etc., in creating this new demand and through these agencies sell dental care at cost to their employees?

The cooperative dental group movement promises to give us a key to the solution of the dental economic problem, in the broad sense of the term. It is a system that will provide adequate scientific dental care for the masses at a fee within their reach and equitable to the dental practitioner. It will do more. It will bring prevention, the ideal of the dental profession, to realization.

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The Color Problem in Dentistry

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Fourth Article

APPLIED COLOR-MIXTURE

Color-mixture in dentistry is confined almost exclusively to porcelain, silicate and oxyphosphate cements. The nature of the first material, porcelain, precludes the possibility of trial mixes, because each mix requires a minimum time of thirty minutes to mould and fuse the sample. This time element makes it necessary that we have a great number of samples on hand, together with a record of their composition, or that we have some system by which all color requirements can be predetermined.

Since in the use of cements it is quite possible to make trial mixes in a few minutes, it becomes essential that we know something of color-mixture in so far as it can be applied to them. The plan of color-mixture most generally used with cements consists of the selection of a color that most nearly matches the case and then altering the selected color with other colors as needed. This method is probably the simplest one, and it is used with excellent results when we are capable of recognizing the nature of the color differences between the selected color and the required color and are then capable of selecting the right colors to make the corrections. For example, if the selected color is a gingival color and is a little too light and a little too saturated, it may be possible to correct it by the addition of a small amount of brown of low saturation. In another example the selected color may be of the correct brilliance but a little too gray, and we are required to add to it a strong yellow and a small amount of white to secure the desired color. But how do we know just what colors are needed to make these corrections?

The answer is based on our knowledge of the psychological primary colors, which were discussed in the second article of this series. In studying them we learned that hue differences in the teeth could be recognized by the fact that one color appears of either a redder or a greener yellow than the other; also, that brilliance differences may be recognized if one color seems to contain more white or more black than another, and that saturation differences are recognized by comparing the amount of gray seen in the two colors when they are of a similar brilliance. It must be remembered that the addition of black or white to a color will reduce its saturation as well as change its brilliance, so for that reason it is desirable to select first a color that has a brilliance as near as possible to that of the tooth before the saturation is considered.

To follow the plan of the psycho-

logical primary colors that are seen in the teeth for the arrangement of cement colors will necessitate the use of two colors presenting hue, reddish-yellow and greenish-yellow. With these two hues we need, theoretically, black and white only. However, the use of black in dentistry should not be attempted, so in place of it let us substitute brown and gray, since brown results from the addition of black to yellow, and gray results from the addition of black to white. We now have five colors, reddish-yellow, greenish-yellow, brown, gray and white. If each of these five colors could be secured in a specified spectral distribution, it would be possible for us to match any color found in the teeth, but manufacturers have given this matter no consideration whatever and consequently we are required to use many more colors than are actually necessary. However, the plan is theoretically correct and, if followed, becomes a very gratifying aid to color-mixture in dentistry.

This plan of color-mixture, based on the psychological primary colors, is illustrated in Fig. 11, the design of which represents one hue of tooth color in various degrees of brilliance and saturation. The horizontal rows represent brilliance and the vertical rows saturation. Note that the five basic colors have been grouped around the periphery of the designed figure, and that white occurs twice, since we have substituted brown and dark gray for black. The colors appearing on the bottom row of the figure are grays in various degrees of brilliance. These have been established by diluting the dark gray with white. The next horizontal row above begins to take on hue, and this hue increases in saturation in the remaining rows as they approach the apex of the design, where the hue appears most saturated. At this point we find two of our basic colors, the reddish-yellow and the greenish-yellow, in a very strong degree of saturation and of medium brilliance. All colors of tooth color must necessarily fall into some section of this figure and can therefore be reproduced by a mixture of the basic colors that surround the figure.

The desired hue is secured by combining various proportions of the saturated *RY* and *GY*. This mixture is then diluted with either brown or white to secure the correct brilliance, after which the saturation is reduced with gray if necessary. A gray of the same brilliance should be selected or, if a darker gray is used, white must be added to restore the brilliance.

Unfortunately, these exact basic colors cannot be secured in most products. The silicate manufacturers do not give us a range of hue differences, and apparently no attempt has been made to imitate tooth color in the oxyphosphate cements. However, an understanding of the scheme of color-mixture above is helpful in making the alterations necessary in the use of the materials that are now on the market.

When developing a color in cement, the material most nearly matching the case should be placed in a small porcelain jar, where it can be mixed with additional colors while dry by the use of a glass stirring-rod. Trial mixes should be made after each alteration. In this manner the color is built up until it matches the case.

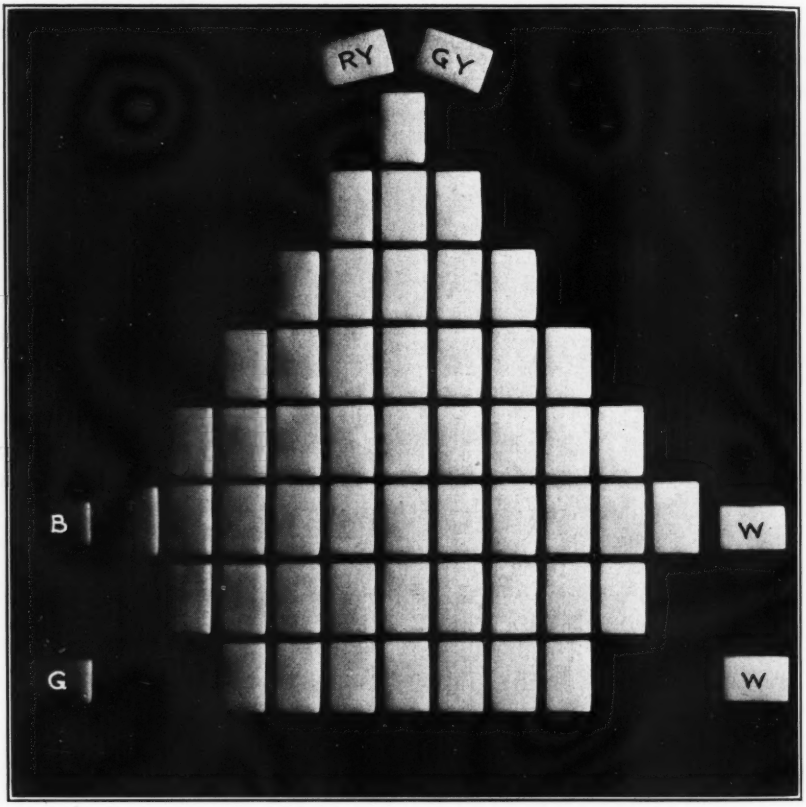

Fig. 11

A plan of color-mixture making use of five basic colors. *RY* designates reddish-yellow, *GY* greenish-yellow, *B* brown, *G* gray, *W* white.

Until the dentist becomes more familiar with the recognition of brilliance and saturation differences, he will probably be required to make the corrections by the addition of one color at a time. For example, he may first recognize that his selected color is too dark and add white to correct it. He may then find that the color is still too saturated and he must add gray to it. In the addition of this gray he may not be able to select a gray of the same brilliance and will add a gray that is too dark, so that after another trial mix is made, he will find it necessary to add an additional amount of white. When too much white has been added at any time, the color should be brought back by the addition of the original saturated color and not by the addition of gray or brown, which would further reduce the color in saturation and ruin it.

COLOR AND VISION

In the study of any particular phase of the subject of color we should never lose consciousness of the fact that color is a sensation; that is, it is a mental or psychological phenomenon. Color does not exist in the outside physical world. However, it is true that certain physical energy-waves do exist. Before the sensation of color is produced, it is necessary that these energy-waves stimulate the nerve-endings in the retina of the eye, which in turn must function normally. But, with all this, color is still a sensation.

In the first article of this series we considered the various qualities of color sensation, and we learned that these qualities could be definitely classified and measured in terms of hue, brilliance and saturation. We learned also that the eye was capable of distinguishing approximately 150 different hue sensations and a great many mote brilliance sensations, and also that there are many saturation steps seen lying between neutral gray and a pure spectrum color. We found also that the fundamental or primary sensations include red, yellow, green and blue, together with black and white, and that some combinations of these primary sensations may be seen in every existing color.

In a subsequent article we studied the physical nature of certain radiant energy-waves which are capable of stimulating the retina of the eye to produce the sensation of light and color. We found that this energy can be classified by the statement of its wave-length, and that different wave-lengths of energy produce different sensations. We learned also that the wave-lengths producing the sensations of red, green and violet hold primacy in the spectrum, and that the sum of their total mixture produces white. We have studied the action of white light on various material objects which are selective in the energy that they reflect and absorb, but we have not considered how these energy-waves affect the eye. To connect the relationship that exists between physical energy and color sensation, it becomes necessary that we give the physiological phase of the subject some consideration.

Color vision is a very broad subject and is too extensive to be considered here even in outline form, because the theories of vision are many and varied in their explanation of the functioning of the eye. However, it is not necessary that we review these theories and the facts that seem to support each one, because we are primarily interested in the effects of the various physiological phenomena and how they may influence our ability to visualize color correctly as it pertains to the teeth.

It will be remembered from the study of physiology that the eye is a camera-like organ which is provided with a simple lens that is capable of adjustment, so that it can focus an image of an observed object on the retina. The retina is a specialized tissue spread out over the interior of the eyeball. Its outer layer consists of the fibers of the optic nerve, and the underlying layer is made up of rods and cones, which seem to be the principal organs of perception. The intensity of the light entering the eye is controlled by the contraction and dilation of the transparent central portion of the otherwise opaque iris. Light entering this central portion, or pupil, stimulates the retina, which in turn

converts the energy into color sensations through its communication with the brain.

The functioning of the retina of the eye varies with the physical differences in the stimulus, and it is these variations that are of special interest to us. We are already familiar with the fact that the longer wave-lengths stimulate red sensations and the shorter ones blue sensations, and from these observations we know that hue is dependent upon wave-length. We have observed also that the intensity of the energy contributes to the brilliance and saturation of colors. Now, the intensity of energy, or light, also effects a change in the hue of colors. In a very strong light the hues of the spectrum are reduced to two, yellow and blue, both of high brilliance and low saturation. When the intensity of the light decreases, the hues are reduced to three, red, green and blue-violet, all of a dark brilliance and low saturation. At the same time there is a marked change in the relative distribution of brilliance throughout the spectrum; the colors of long wave-length become proportionately darker than those of shorter wave-length. This shift of brilliance with a decrease of illumination is called, after the Austrian physiologist who first observed it, the *Purkinje phenomenon*. This phenomenon may be demonstrated by viewing a red and a blue color of equal brilliance under strong illumination and then decreasing the light to a low intensity, after which the blue will appear brighter or lighter than the red. We can escape the ill effects of this phenomenon by doing our color work in light of an average intensity, which means that we should avoid direct sunlight as well as twilight. The eye is capable of adjusting itself to various conditions, but not sufficiently so to overcome the Purkinje effect.

Adaptation

The quality of visual sensation is dependent also on the time during which energy-waves affect the eye. When we enter a very dark room, we are unable to visualize objects, but after a few moments we become accustomed to the darkness, and vision returns. The longer we remain in the dark, the better we are able to see. This phenomenon is technically known as *adaptation*.

The law of adaptation states that all sensations of light tend toward middle gray, and that all sensations of color tend toward neutrality. When we wear a pair of amber glasses for a time and then remove them, everything appears much bluer than it ordinarily does, but after a few moments this blueness disappears because adaptation has set in. In the process of adaptation the colors tend toward neutrality, and neutral colors are secured by the mixture of complementary colors. As the eye is being adapted to the blue of daylight, the color is mixed with increasing amounts of its complementary color, so that the blue gives way to a more neutral color. In the same manner the blacks in the field of vision are mixed with increasing amounts of white, as time goes on, and the whites with an increasing amount of black.

The mixture of the complementary colors in the field of vision can be better appreciated after a demonstration of the negative after-image. If the vision is fixed upon a half-black and half-white card for a minute or more

and the card is suddenly changed for a neutral gray card, a white image will appear where the black was previously seen and black where the white was seen. If the vision is fixed upon a saturated red object until a portion of the retina becomes red-adapted and is then shifted to a neutral gray background, a green after-image will be seen. Now, if the vision were allowed to remain fixed upon the red object for a longer time, the red would become increasingly grayer as the process of color-mixture in the field of vision takes place. Certain theories of color vision hold that this phenomenon is due to color fatigue, but authorities disagree as to whether it is a physiological or a psychological process.

The phenomenon of adaptation, with its accompanying color fatigue, is a source of a great deal of trouble to the colorist who is required to make close matches, such as were necessary in the arrangement of tooth color into steps of brilliance and saturation, as illustrated in Fig. 11. In this sort of work mistakes are very easily made unless the phenomenon, with all its peculiarities, is thoroughly understood. For example, let us say that we are given three samples of a red color and three samples of green and are told that in each of the two groups there are slight differences in the various dimensions. We are then told what these differences are and are asked to point them out. To make the problem rather difficult, let us say that two of the reds are alike in hue and one is slightly different, that two are alike in brilliance and one slightly different, and that two are alike in saturation and one different. The same arrangement applies to the green group, but let us start with the reds and look for the one that is different in brilliance. We should be able to decide on this one in about thirty seconds.

Now let us look for the one that is different in saturation. This is more difficult, but we finally make a decision after about one minute. We still have the hue difference to select, but by this time all the reds look alike to us, and they look very much grayer than they did at the start, because we are now red-adapted and fatigue has set in. For this reason we are unable to recognize the hue difference, and it is necessary that we rest our eyes. When we are red-adapted, we are green-sighted, and since we have this problem to work out in the green colors as well, let us glance at them immediately. We shall be surprised to find how well we can see the green colors and how saturated they appear. We instantly select the one that is different in hue and the one that is different in saturation, because these differences are more easily seen when we are green-sighted. If we take our time in selecting the brilliance difference, we shall become green-adapted and red-sighted. Now that we are red-sighted, let us look back to the red colors and we shall see immediately the one of hue difference which we could not select at the first trial.

In taking the shade of the teeth these same phenomena become evident at times to such an extent that all the teeth on the shade ring seem to look alike; that is, the yellows seem to fade out and become gray, so that the saturated gingival colors are difficult to distinguish from the gray incisal colors.

Another feature enters into this process of adaptation and fatigue when

we are taking the shade of natural teeth, and that is the after-image caused by the red of the mucous membrane and lips. This red fatigues a small portion of the retina, producing a green after-image, which may become mixed with the yellows of tooth color, thus influencing the hue. Lady patients should be asked to remove lipstick, and the dentist should avoid looking directly at the gums and lips.

Dentists who have trained themselves to recognize color differences instantly thus avoid becoming yellow-adapted and fatigued when taking the shade, but those of us who are required to study the color for some time should be provided with some means of resting the eyes and producing yellow-sightedness. A sheet of dark blue paper can be used for this purpose. It should be at least twelve inches square and viewed at a distance not exceeding that between the eye and the patient's teeth. This will allow the image of the blue card to cover a larger area of the retina than is used and fatigued by the colors of the patient's teeth, lips and complexion. We become light-adapted and yellow-adapted or dark-sighted and blue-sighted by a constant gaze at the teeth. The dark blue card relieves the fatigue and restores light-sightedness and yellow-sightedness, which is required to recognize the minute color differences that exist in the teeth.

The size of colored objects influences their apparent color. Large objects of the same color specifications will appear very much more saturated than small objects, because the image of the large object covers a much greater retinal area and therefore many more cones of vision are stimulated. This need not concern the dentist to any great extent, for the relative differences between the size of shade-guide and natural teeth are not sufficiently great to produce a perceptible influence on one or the other. In colorimetric work the areas of the samples and standard should be the same to avoid an error in the specification of saturation. This phenomenon is the cause of many mistakes made by the laity in the selection and purchase of yard-goods from a small sample and in the matching of a small sample with a large bolt of material. Samples of equal size should be used when matching any type of colored article.

Color and Environment

Adaptation, color fatigue and the size of the retinal area stimulated are not the only features that influence the appearance of colors. The contrast between a color and its environment has a very decided effect on the quality of the color. The cause of this phenomenon is not clearly understood, but it is not difficult to demonstrate its unusual effects. If a patch of neutral gray is placed on a black background and a similar patch of the same brilliance is placed on a white background, the gray surrounded by the black will appear much lighter than the patch surrounded by white. It is difficult to make these two grays appear alike, even though the one on the dark ground is reduced considerably in brilliance.

If several gray papers varying in brilliance are placed side by side so that the margin of one comes in contact with its neighbor, the phenomenon of *induction* can be demonstrated. The edge of one gray paper will appear darker where it approximates the lighter

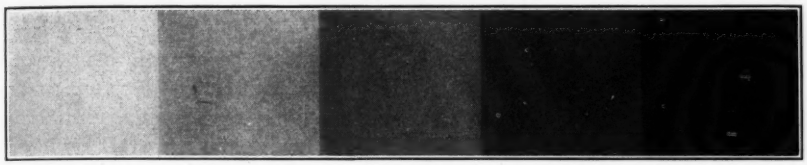

Fig. 12

An illustration of the phenomenon of induction. Each square, though uniform in brilliance, appears lighter at the right edge. This series of grays was made by exposing a photographic plate in a weak light and pulling out the slide of the plate-holder an inch at a time at regular intervals.

paper, and the edge approximating the darker paper will appear lighter, as illustrated in Fig. 12.

Contrast influences chromatic colors as well as neutral colors, and the process of induction is slightly apparent when two colors are placed in approximation. Complementary colors will appear increased in saturation and brilliance and also seem wider apart in hue. When saturated colors are contrasted with white or gray, a change occurs in the hue of the saturated color, and the white or gray takes on a faint hue.

This change of quality in approximating colors is technically known as *simultaneous contrast*. The phenomenon is clearly demonstrated in the appearance of the natural teeth, which are contrasted against the gums, lips and complexion of the patient. The skin of different individuals contains varying amounts of red and yellow, and when red is dominant, the teeth of that individual appear much greener-yellow than the average yellow of tooth color, and the hue of the teeth of sallow-complexioned people appears of a redder-yellow. The skin may also contain a great deal of gray, which may cause the hues of the teeth to appear more saturated. In the same manner light and dark complexions influence the brilliance of the teeth.

One area of a tooth may be influenced by simultaneous contrast with the color of another area of the same tooth. The most noticeable example of this particular environmental influence is seen in the neutral gray incisal edges, which appear bluish-gray in contrast to the more saturated yellows of the middle and gingival areas. The question of whether or not blue can be seen in the natural teeth no longer remains a subject for discussion when the phenomenon above is understood. There is no doubt that blue can be seen in the thin edges of the incisors. However, when these areas are isolated for a color analysis, they are found to be neutral gray, and when this neutral gray is reproduced in porcelain and used in an artificial tooth with a saturated yellow, it will appear blue just the same as it does in a natural tooth. Blue pigment is sometimes used in gray colors to neutralize the trace of reddish-yellow that is found in the gray, but if sufficient blue is added to give the mixture a hue, it cannot be used to match a natural enamel successfully. In the preparation of a stain to match these areas it is necessary that we use more

blue pigment than in the coloring of a porcelain, because these stains are placed in thin layers over or beneath a saturated material, so that there is a slight mixture of the two colors by subtraction. If this stain did not contain blue pigment, this mixture would make it appear yellow-gray instead of neutral gray.

A very similar example of the type of contrast above is found in the cotton industry. Cotton is graded by a measurement of its color. The better grades are more saturated than the poor grades, and these better grades are spoken of as yellow cotton, while the poor grades are called blue cotton. But in the color measurement both grades are found to have exactly the same yellow hue that is found in the lightest shades of teeth. Now, why is one grade called yellow and the other blue when both are yellow? The poor grade is much less saturated and therefore grayer than the better grade, and when the two are seen together in a sample box, the grayer cotton looks blue because it is influenced by simultaneous contrast. However, it is still yellow upon analysis.

Color-Blindness

It is important for the dentist to know that total color-blindness is very rare, but that partial color-blindness occurs in four per cent of adults. The totally color-blind are conscious of their condition, but the partially color-blind may not be aware of their deficient color-vision, since their sensibility for hue may be normal for the greater portion of the spectrum. If the dentist has ever experienced any difficulty in distinguishing hue differences, he should be examined for partial color-blindness. In case some portion of the retina is found to be insensible to certain colors he should have his case studied thoroughly to determine whether or not it is possible for him to distinguish accurately between color differences that exist in the teeth. This is a question that he should not decide for himself, but he should consult some one experienced in the application of physiological optics.

We have now briefly discussed the various phenomena that result from the peculiar manner in which the retina responds to the stimulus of light and color. These phenomena that are associated with adaptation, after-image, color fatigue and contrast are all closely allied in their physiological origin as well as in their psychological manifestations, so much so that it would be impossible for us to classify them in the event that it were possible for us to identify their influencing characteristics when viewing colors. We can and should avoid color fatigue, but we cannot and should not try to sidestep the effects of contrast, in spite of the fact that many of us have been taught to attempt it and have been promised that our ability would increase with experience.

Experience is undoubtedly a valuable asset to any type of artist, but it cannot teach us to do the impossible. Experience has never taught a dentist to carve and shape a jacket crown from memory alone. He does not even attempt it. Instead he makes a cast of the approximating teeth to guide him in all the dimensions of form that he is required to reproduce. If it were not

possible to alter the form of the finished crown, the dentist would exert the utmost care in securing a perfect impression for the plaster cast, so that alignment, contour and occlusion could be established absolutely. If we were required to dispense with the plaster cast and could not alter the finished crown by grinding, what success should we have in this field of work? In other words, if we relied on memory alone to reproduce the form of a tooth, how many years of experience would be required to make a perfect crown?

Now, color is even more difficult to reproduce from memory than form because of the various physiological phenomena that enter into the visual analysis of color. No dentist attempts to reproduce the color of a natural tooth in a jacket crown from memory alone. However, some of us have been led to believe that experience will teach us a great deal more about color than it really will, and for this reason we are inclined to attempt an estimate of how a certain color viewed in one environment will appear in another environment. A set of artificial teeth which have been selected on their mounting of black carding-wax never looks the same when set in vulcanite and placed in the mouth. A certain enamel color in porcelain will not look the same when placed over a different body, but we attempt to estimate how it will look, for we often attempt to rearrange the colors in shade-guide teeth to meet certain requirements.

Experience cannot eliminate the mistakes that are made in color if the color is not selected in the environment in which it is to be finally placed. For example, a patient presents for extractions prior to having full dentures made. The dentist makes a note on the chart that this patient's natural teeth are decidedly greenish-yellow. When the dentures are constructed, a greenish-yellow tooth is used, and when they are placed in the mouth, the yellow disappears and the teeth appear gray-green, with the result that the case must be reconstructed to correct the color. Now, why did the color of these artificial teeth appear so green? Because the sensation of green seen in the natural teeth was due to the contrast with their environment, which was evidently very red. This patient should have been supplied with teeth having a reddish-yellow (pink) hue, which in his mouth would assume the same color as his natural teeth, because the red of the environment is a much redder red than the red in the teeth.

The example above teaches a very important lesson. Regardless of our experience in color we should never attempt to estimate or specify the color of the teeth by visual analysis alone. We should always use a shade-guide tooth for comparison. In jacket crown and porcelain inlay work we should have a large quantity of shade-guide teeth, unless we have them placed in an ordinal arrangement according to their hue, brilliance and saturation. It is then safe to estimate one perceptible step in any one dimension of tooth color, provided we make the estimate by the comparison of the natural tooth with the shade-guide standard.

(To be continued)

Some Essentials in Full Denture Technic

By F. M. HIGHT, D.D.S., Houston, Texas

(Literary Collaboration by George Wood Clapp, D.D.S.)

Fifth Article

THE IMPORTANCE OF CORRECT JAW RELATIONS

So much attention has recently been paid to the articulation of artificial teeth that it is sometimes forgotten that centric relation is primarily a jaw relation and only secondarily a tooth relation. If centric relation is correctly established, minor errors in tooth arrangement can be easily corrected. If it is not correctly established, it will be difficult or impossible to establish it by grinding the teeth.

If check-bites are to be taken as guides in determining the lateral paths of the artificial condyles, it is very important that they should be started from a correct centric relation. Teeth arranged to the paths made from such a start will make what Gysi calls *easy-running dentures,* because the tips of the cusps of one set will pass through the bottoms of the grooves of the opposing set without interference. But if the centric relation from which the check-bites start contains a protrusive error, the lateral paths of the articulator will not be correctly set, and, when the dentures are finished, they will not be easy-running, because the tips of the cusps will not pass through the bottoms of the grooves of the opposing teeth, but cusps will ride on cusps (Figs. 12-13).

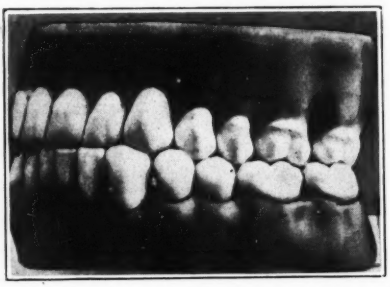

Fig. 12

The movement of cusps through opposing grooves, buccal aspect, to make what Gysi calls *easy-running* dentures. (From *Prosthetic Articulation,* by George Wood Clapp.)

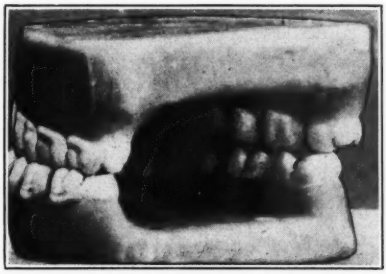

Fig. 13

Movement of cusps through opposing grooves, lingual aspect. Failure to secure this relation is a frequent cause of discomfort and dissatisfaction. (From *Prosthetic Articulation.*)

While the importance of gross errors in jaw relations is immediately per-

ceptible to all, the importance of slight protrusive or lateral errors is not generally appreciated. This is true in every form of preventive and restorative dentistry, but the avoidance and detection of such errors will be especially considered here in connection with the construction of full dentures.

In artificial dentures in which the curve of Spee is well marked, a protrusive error of a millimeter in establishing centric relation may bring the molars into contact, while the anteriors are still far apart, when the mandible moves back to its correct position. In dentures in which the curve of Spee is flat, an error of this extent will not separate the anteriors so far but may be the source of much annoyance when the mandible moves back, because the sliding contact of the cusps that unavoidably results from the protrusive error tries continuously to move the jaw forward to the position for which the teeth were made, while long-established habits tend to pull the jaw backward. Not only do errors of this sort make dentures uncomfortable and perhaps nearly worthless from the standpoint of mastication, but the continuous *side-thrust* from an unsatisfied tooth contact may cause much more rapid resorption of the alveolar ridges than would otherwise occur.

Such errors exist, in greater or less degree, in most of the artificial dentures in use today. They may often be found in dentures made by some of the greatest students and finest workers who have not adopted the only technic by which such errors can be recognized and avoided. Many cases have come under the writer's observation in which patients have discarded dentures for which they paid large sums to specialists in favor of dentures made by some one who knew far less about the fundamentals of good denture work, because the specialist failed to register correct jaw relation and the other man, either by accident or by technic, obtained it and avoided the particular kind of interference that made the other dentures uncomfortable.

Most such errors remain unrecognized during persistent efforts to make the dentures comfortable. Some of them can be corrected without reconstruction of the dentures; many of them cannot. The technic employed by many of the best-informed denture-workers does not enable them to escape such errors or to recognize them when they are made. Experience and observation show that the Gysi principle of recording the movement of the mandibular incisor point enables dentists to avoid errors or correct them, but that the methods employed for the use of this principle have not been entirely satisfactory and should be modified. A suggested modification, which works very well in practice, is described later in this article under the heading *Establishing Centric Relation.*

Another advantage of employing a correct technic is that, in cases where because of lack of freedom of movement of the mandible the tracing cannot be properly made so that the dentist is not certain that the centric relation from which he finally decides to work is correct, he can warn the patient at the time the dentures are made that the relation is a little uncertain, and that it may be necessary to remake one or both dentures before satisfaction is achieved.

In spite of the fact that these prin-

ciples have been published and talked about for more than ten years they are not so well understood as they must be before denture-making will be generally successful.

Why the Apex of the Gysi Gothic Arch Tracing Indicates Correct Jaw Relations

The Gysi Gothic arch tracing with a sharp point can be started by the patient only when the heads of both condyles are in the most retruded positions from which free lateral movements can be made. Note the emphasis placed on the *sharp* apex and then illustrate the whole procedure to yourself by the following simple experiment:

Stand with your back against the wall with your arms by your sides, flex the arms until the forearms are parallel with the floor, and clasp the hands in front of the body. Hold a pencil in the clasped hands with the point downward. The pencil represents the mandibular incisor point, and the elbows represent the condyles. Hold the right elbow against the wall and move the pencil across the body to the right. Then hold the left elbow against the wall and move the pencil to the left. If you can visualize the arcs the pencil would make on a large sheet of paper, you will see that, described from centers that do not move forward or backward, they would be definite and would form a Gothic arch with a sharp point.

Now move both elbows forward a few inches from the wall and hold them there. Make the same lateral movements as before. There is no support behind the elbows, and they may move forward or backward without your being able to recognize the movement or identify its character. It is quite possible that the elbow that seems to be stationary may move sufficiently to change entirely the character of the arcs traced by the pencil.

This is exactly what may happen with the condyles. When they are retruded in the fossae, they are like the elbows against the wall, and the incisor point makes definite arcs, first out of one fixed center and then out of another. Two such arcs meeting make a sharp point. The Gothic arch, when properly made, has a sharp point, because both condyles are in the most retruded positions from which they can make free lateral movements. That is the only condyle position from which such a record can be started, and such a record is the only means by which the dentist can know that both condyle heads are in that position in the fossae at the same time.

The beginner in the use of the Gysi Gothic arch tracing often becomes discouraged with his first case or two and abandons the technic. He may encounter patients who are not able to move the mandible freely, so that he cannot get a record. If he will send such patients home for a day or two with instructions to exercise the jaw, they will often so loosen it that he can get the record. Or he may have patients whose mandibles for a long time have been held in a protruded position, and who are incapable of making anything but a faulty arc or one with a rounded point. There are some people who will never be able to make a satisfactory tracing, and it might be his misfortune to encounter these in his early efforts. If he will persevere in spite of difficulties, he will soon come to a

mastery of the technic and find it of great value.

In difficult cases he will be able to make repeated trials intelligently and finally arrive at the best approximation of centric relation that can be made. When a satisfactory centric relation is impossible, he will know it and know why and can govern his future technic and relations with patients by that knowledge. And he will finally come to a perception of the great value of this technic, not because it by itself gets centric relation better than another technic might, but because it shows the dentist when he has obtained it, which is information of the greatest practical value supplied by no other technic.

The men who use this method and insist on securing the retruded position of the mandible do so because they believe that by means of it they can produce better dentures for their patients. However, it is a fact that some few cases do not function to this retruded position, possibly because the proper opening of the jaws is not secured.

Establishing Centric Relation

Baseplates and occlusion rims are essential to the technic which the writer employs. The baseplates must be made of some material stronger than wax, so that they will retain their shape in the mouth. A platinoid wire, about 14 gauge, should be closely adapted to the mandibular baseplate just lingual to the crest of the ridge and attached by heating. Occlusion rims of the desired height and thickness are built of compound. The baseplate of each is closely adapted to the cast, so that the periphery will be the same as that desired for the denture.

The maxillary baseplate is now put in the mouth, and the compound rim is trimmed to approximately the length desired for the maxillary teeth. Its occlusal surface is then oiled. The occlusal surface of the mandibular rim is heated with the flame of a mouth blowpipe and tempered in water, and the baseplate and rim are placed in the mouth. The patient is instructed to relax and then touch the posterior teeth together, that being one of the best ways to get the patient to bite in a retruded position. The cold maxillary rim will crush down the soft mandibular rim and perfect the contact between the two. This process is repeated until the desired height of the combined rims has been reached, as shown by the length of the face, the proportionate length of the part of the face below the nose and the position of the lips as they lie in contact in repose one against the other. This last can be best seen by viewing the face in profile.

When the maxillary occlusion rim bites into the mandibular rim, the excess compound will be pressed out on both sides of the mandibular rim. This should be trimmed away at each closure except the last, when only the excess on the labial and buccal should be removed, leaving the lingual excess in place to hold the occlusion rims in right relation while the horseshoe plate and incisor path marker are attached.

The Enlarged Horseshoe Plate

As has been stated elsewhere, the only technic that enables the dentist to recognize centric relation is effected by the horseshoe plate and the incisor path marker. The forms in which these were offered to the profession were a

distinct advance over anything then in existence, but experience shows that they may be modified in such way as to make them much more serviceable. The great trouble was that the record was traced at the incisor points, where it was so hidden by the upper lip that it was not easy to see just what the patient was doing and correct errors, and the movement was often limited, so that provide for any record likely to be made. A similar horseshoe plate was made for the maxillary occlusion rim, except that the extension was narrower and a quarter inch of the outer end was turned downward at a little more than a right angle. The portion turned downward provided a place to which the Gysi incisor path marker could be attached with sticky wax (Fig. 14).

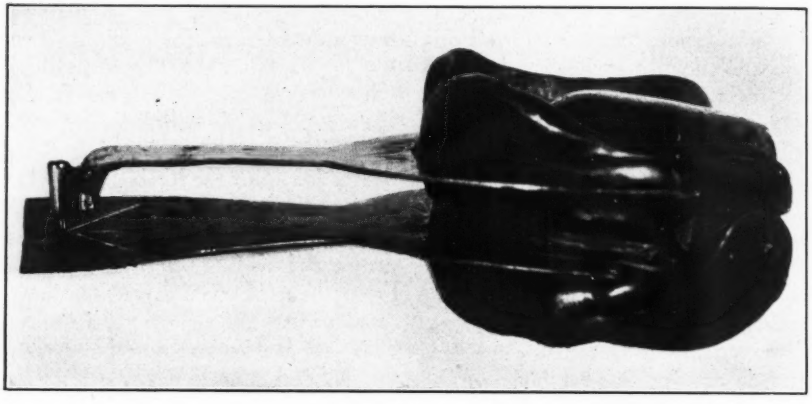

Fig. 14

The horseshoe plate, extended forward about two inches as suggested, is here shown attached to the mandibular occlusion rim. A similar horseshoe plate is attached to the maxillary occlusion rim and supports the Gysi incisor path marker as shown. Great advantages result from the extension of the horseshoe plates and the consequent enlargement of the tracing. Any dentist can make these plates from 18-gauge sheet brass.

the tracing was very small. It occurred to the writer long ago that if the tracing could be made larger and extended out of the mouth to where it would be easily visible, better results might be obtained. He therefore extended the horseshoe plate forward two inches from the labial margins of the occlusion rims and so shaped it that it could be inserted into the buccal surfaces instead of on top of the rims. The forward end of the extensions was widened to

The advantages of the extended horseshoe plates are great. The record is cut in plain sight and is much larger than when made in the mouth. It is easy to see what the patient is doing and direct the necessary movements. This is especially important in taking check-bites, as will be explained.

The upper surface of the enlarged mandibular horseshoe plate may now be blackened for the tracing in any of several ways. There is a special kind

of pencil known as lumberman's pencil. When one of these can be obtained, it may be rubbed on the warmed surface of the plate and will prove to be very convenient and satisfactory, or oil of cloves may be burned on cotton and the smoke allowed to blacken the plate. A thin layer of wax is then flowed over the blackened surface, ordinary carding wax being preferable for this purpose.

RECORDING MANDIBULAR MOVEMENTS

The mandibular baseplate, with the extended horseshoe plate attached, and the maxillary baseplate, with the extended incisor path marker holder attached, are now placed in the mouth. Added stability may be given the baseplates by a thin coating of gum tragacanth or some prepared adhesive. The mandibular baseplate is held in position by the forefinger of each hand placed along the buccal margin. The patient is made to relax and close in a retruded position. The pin of the incisor path marker is released so that it will be in contact with the blackened area of the horseshoe plate. The patient is then instructed to slide the mandible straight forward as far as possible and then backward as far as it can go. This is repeated several times. When it is seen that the arrest of the backward movement stops the pin at the same point each time, this may be accepted as the retruded position of the mandible.

For convenience this record is taken on the mandible from a fixed point on the maxilla, which as Gysi has pointed out, is much like holding a pen still and moving the sheet of paper in order to write. If the record were to portray accurately the movement of the mandibular incisor point, the horseshoe plate should be on the maxillary baseplate and the incisor path marker should be on the mandible. This would bring the retruded position of the mandible at the back end of the line which is traced in the protrusive and retrusive movements, where it belongs, and would lead to no confusion. But such a record would have to be made on the under side, where it is practically hidden from sight, and where the patient's movements in making tracings cannot be conveniently directed. For the sake of the convenience of the visible record and the ability to direct patients the record is made, so to speak, upside down. The confusion which might otherwise result may be avoided if the dentist will remember that the record reverses the movements.

When the pin of the incisor path marker is in the most forward point of the forward and backward line, the patient is instructed to slide the mandible to one side as far as it will go. This will trace a line on the blackened area of the horseshoe plate. The patient who finds this hard to do may sometimes be assisted if the dentist will place his finger on the outside of the cheek at about the mandibular second molar region and instruct him to slide the jaw into contact with his finger. When the jaw has gone as far to that side as it can, the patient is instructed to open the mouth, to return to the retruded position with the mouth open, and then to bring the rims in contact again. The jaw is then moved forward and backward a few times in the same line as before, and then, when the pin is at rest in the forward end of the path, he is instructed to slide it to the opposite side

in the same manner as before, which will trace the path of the lateral movement on that side. He should then open the mouth. The reason for instructing the patient to open before returning the mandible to central relation is to avoid confusing the record with the paths of intermediate movements.

If the heads of both condyles are in the most retruded position from which the mandible can make lateral movements, the lateral paths will meet at a sharp point. If the heads of both condyles are not in that position, the point will not be sharp. The roundness of the point or the flatness of the arc will be in proportion to the protrusion of the condyles when the records are made. If the condyles are far forward, the incisor point may trace a flat arc across the median line and about at right angles to it.

Dentists who are not familiar with the making of incisor path records are sometimes discouraged because frequently they run into difficult cases before they have mastered the technic. Some patients have so little lateral jaw movement that they cannot make satisfactory records at the first trial. If they are shown how to exercise the jaw, in a few days they may so greatly increase its mobility that satisfactory records can be made. Other difficulties may appear, but they may be mastered as in any other dental technic, and the results will repay the necessary perseverance.

Let it be thoroughly understood that when the correct jaw relation has been recorded by the sharp point of the Gothic arch, and when the dentures have been constructed without errors of technic which might cause a loss of this relation, they will also function in a protruded relation. If a slightly protruded relation is accepted as a starting-point, the teeth will function in that protruded relation at less than their maximum efficiency but cannot function in the relation indicated by the apex of the Gothic arch without trauma. Most mandibles are capable of a relation more retruded than that shown by the apex, but from this most retruded position free lateral movements cannot be made.

The denture-worker must decide whether, for technical purposes, centric relation means the rest position of the mandible or the position of the mandible from which the Gothic arch tracing is produced. Some workers object to the Gothic arch position because it is not always continuously comfortable and patients tend to return to the rest position, which is comfortable. The shortcoming of the rest position for working and teaching purposes is that neither the technic nor the description of the technic can start from it.

The position which produces the Gothic arch tracing is that at which the mandible finishes the masticating excursion. It is less convenient and practical to try to arrange artificial teeth by following the mandibular excursion than it is to reverse that excursion and start where the mandible finishes. This reversal of the excursion brings the position of the mandible which produces the Gothic arch tracing as the most convenient starting-point from which to begin the arrangement of the teeth.

1323 Medical Arts Building

(To be concluded)

An Outline of Dental Pathology

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VII

INFLAMMATORY DISEASES OF THE MOUTH (*Continued*)

STOMATITIS (*Continued*)

Chemical stomatitis.

Certain chemicals taken into the system as drugs often tend to accumulate and produce a catarrhal stomatitis and a more or less purulent or necrotic inflammation.

Lead stomatitis.

Lead occurs in the blood in a loose chemical combination, lead albuminate. As it is carried to the mucous membrane of the mouth it is changed by the hydrogen sulphid present in the mouth to the black sulphid of lead. This black deposit is found in the upper layers of the gum, producing a strikingly bluish-black border on the edges of the gum, the so-called *lead-line*. Gums inflamed, red, swollen, and bleed easily. Condition usually more pronounced on the mandible.

Mercurial stomatitis.

Very often in the treatment of syphilis the insoluble salts of mercury tend to be excreted rather slowly from the system, and the excessive accumulation may give rise to mercury poisoning. In the mouth it acts as a chemical irritant, especially if in contact with the mucous membrane for a long time. Gums around the teeth become markedly inflamed, red and swollen, with great increase in flow of saliva. There is a distinctly metallic taste present. A fibrinous exudate with grayish coating appears on the tongue, and a bad breath also is noticeable. The teeth become tender.

Bismuth stomatitis.

Similar in character to mercurial stomatitis.

Leukoplakia.

May follow acute catarrhal or other inflammatory processes, most frequently syphilis, and may be due to persistent irritation, as from use of tobacco. Owing to hyperplasia of the epithelium and submucous tissue, white patches of varying extent may form on the tongue or elsewhere. These, through excessive increase in the epithelium, may project in wart-like form from the surface. When the thickening is accompanied by local inflammatory thinning, it produces the condition known as *geographic tongue.*

Black hairy tongue (hyperkeratosis linguae).

Another inflammatory condition, in

which excessive growth and hornification of the epithelium of the filiform papillae of the tongue are seen. The elongated filiform papillae adhere to one another and contain many bacteria in their meshes. As a result of bacterial action, the elongated papillae become discolored brownish-black and resemble long black hairs.

Herpes labialis.

A vesicular eruption upon lips, mouth, tongue or cheeks. The fluid is clear, is soon discharged and forms a scab. It accompanies colds, fevers, gastric disorders and is often called a *cold* or *fever sore*. It may follow a direct irritation of the nerves, as after the use of the rubber dam or dental operations, or it may be of reflex origin or due to neuritis. Infection also may play a part.

TUMORS (Neoplasms)

The word *tumor* means a swelling, but is restricted to new tissue growth or neoplasms. It may be said to be a "mass of cells or tissues resembling those normally present in the body but arranged atypically. It grows at the expense of the organism without at the same time subserving any useful function." Characterized by irregularity in growth in both structure and extent and by a lack of restraint which limits growth of tissues, as in repair, etc.

Tissue types.

Tumors are composed of the same types of tissues normally found in the body, with more or less well defined departures. The cells often represent embryonic or reversion forms of cells. The cells of tumors multiply very much like normal cells, but there are some abnormalities in their division.

Growth.

Rate of growth varies greatly. Some grow very slowly, making little progress in years, while others grow with great rapidity. Tumors may grow by:

(1) *Central, interstitial or expansive growth.*

The cells increase within the tumor or within a capsule and push outward into the surrounding tissue.

(2) *Dissemination.*

(*a*) *Infiltration.*

The cells emigrate via the blood or lymph or by means of their ameboid movement into the neighboring tissues and there multiply.

(*b*) *Metastasis.*

Cells enter the blood or lymph and are carried to other parts of the body, causing metastatic or secondary tumors.

Shape, number, etc.

Circumscribed or infiltrating, large or small, miliary, nodular, fungoid, polypoid, etc. Single or multiple, primary or secondary.

Clinical division.

Benign and *malignant*. The benign are more or less harmless, while the malignant tend to kill the organism. Chief differences between these two types are as follows:

Benign	*Malignant*
(1) Do not metastasize.	Metastasize.
(2) Generally encapsulated or circumscribed.	Infiltrating, not circumscribed.
(3) Grow slowly.	Rapid-growing.
(4) Do not recur when removed.	Usually recur.
(5) Do not invade tissue.	Invade surrounding tissue.
(6) Do not interfere with health.	Usually produce cachexia and generally cause death.

Etiology.

General conditions.

(1) *Age.*

Tumors of early life are nearly all of connective-tissue type or benign. Tumors of adult or late life are of epithelial type.

(2) *Sex.*

Malignant growths are more common in women.

(3) *Heredity.*

Has slight effect.

Local conditions.

(1) *Local injury.*

Chronic irritation and injuries predispose to tumor production, especially of malignant forms. Epitheliomas frequent in the mouth as result of irritation caused by rough tooth or ill-fitting denture and on the lip as result of constant irritation from a pipe.

(2) *Theories.*

Certain theories have been advanced regarding the causation of these tumors, as, for example:

Cohnheim's theory of displaced embryonal cells or "rests." In embryonal life cells or groups of cells are displaced and later, when an irritant is present, develop into tumors.

Virchow's theory. Tumor production due to local irritation.

Several other theories have been quoted as *Adam's theparasitic, biological,* etc.

CLASSIFICATION OF TUMORS

Source	*Benign*	*Malignant*
Connective tissue		Sarcoma
Fibrous tissue	Fibroma	Fibrosarcoma
Fatty tissue	Lipoma	
Bone tissue	Osteoma	Osteosarcoma
Cartilage	Chondroma	Chondrosarcoma
Muscle	Myoma	
Nervous System		
Neuroglia	Glioma	Gliosarcoma
Blood and lymph-vessel	Lymphangioma	Endothelioma

Tumors of oral cavity.

Tumors of the hard and soft tissues of the mouth are fairly frequent. We find sarcomas and epitheliomas of the tongue, cheek, lip, tonsil, jaws, etc. Benign tumors, such as fibromas, lipomas, osteomas, etc., are also seen.

Benign tumors.

Epulis.

A tumor of gum tissue. Formerly included all types of tumors, but now restricted to benign tumors of the gums.

There are three types of epulis, distinguished as follows:

(1) *Fibrous epulis.* Hard, round, pedunculated, circumscribed, and does not bleed. Arises from the periosteum. Microscopically it shows connective tissue.

(2) *Giant-cell epulis.* Softer, more diffuse, has flat base, bleeds easily and is darker in color. Arises from the deeper portions of the peridental membrane or bone marrow and accounts for the destruction of bone usually accompanying this type. Microscopically the giant cells are numerous in the looser fibrous tissues.

(3) *Vascular epulis* (*angio-granuloma or pregnancy tumor*). Reddish or bluish in color where the mucous membrane is intact, while ulcerated areas either show raw bleeding surfaces or are covered with grayish membrane. Often pedunculated, these tumors apparently originate from the blood-vessels of the deepest portion of the connective tissue or from the periosteum itself. Microscopically the whole tumor mass appears to be made up of numerous engorged blood-vessels.

Lipoma.

Benign tumor composed of fatty tissue. Soft, elastic, round, more or less fluctuating. Often combined with other forms, as fibro - lipomas. Microscopically resembles normal adipose tissue, except that the cells and lobules are larger and less regularly arranged.

Osteoma.

Benign tumor composed of bony tissue. Of slow growth, single or multiple. Commonly seen on the lingual surface of the mandible as a small knob, usually in the bicuspid area. Another common site is in the median suture of the hard palate. When the tumor projects from the surface of the bone, it is called an *exostosis.* Microscopically it may resemble the cancellous tissue of normal bone or it may be very hard and dense like ivory.

Adenoma.

A tumor composed of glandular tissue. Two varieties, as follows:

(1) The *alveolar* is composed of acini lined with epithelial cells.

(2) The *tubular* or *canalicular* is composed of long tubules lined with cylindrical cells.

Papilloma.

Benign fingerlike tumor composed of epithelial tissue externally and connective tissue with

blood-vessels internally. Found on tongue, lip and gum.

Angioma.

A tumor composed of new blood- and lymph-vessels or cavities. There are two forms, *hemangioma* and *lymphangioma.* Hemangiomas are divided as follows:

(*a*) *Simple angioma.*

Found most frequently in skin or subcutaneous tissue about the face. Also called vascular nevi or "*strawberry marks.*" Usually congenital.

Microscopically they appear circumscribed and raised above the surface.

Microscopically they are composed of dilated or pouched interlacing capillaries with thin or thick walls.

(*b*) *Cavernous angioma.*

Found in skin and subcutaneous tissue, they are erectile, pulsating in many cases, and frequently multiple. Usually bluish in color and composed largely of intercommunicating irregular spaces filled with blood and usually lined with endothelium with fibrillar connective tissue between.

Teratoma.

Applied to tumor which contains a great number of different forms of tissue usually embryonal in character. Not considered true tumors. Frequently found in parotid glands. Hard and irregular in outline. Often contain cartilage, bone, teeth, hair, skin, etc.

5 East 57th Street

(*To be concluded*)

Dentistry Today

By ARTHUR G. SMITH, D.M.D., Peoria, Ill.

VI

It is a well established fact that the mind may be reached in several ways. That of verbal persuasion—"talk"—is, with many people, one of the least effective. Therefore, when confronted with a Patient who happens to be what the Psychologists call "Eye-Minded," any Dentist may utterly fail to present an adequately convincing argument, so long as language alone is employed. When the eye of your Patient is seen to be wandering—when the sense of failure to get your message across sickens you—that is the moment to remember suddenly that "I have a Model of a very successful case quite similar to this problem of yours which may help you to a clearer understanding of what I am talking about." Returning with this model in hand, you carefully go over

the ground again—usually with a much better following on the part of your Patient.

Your stock of models should include typical and honest presentations of every sort of restoration made in your office. *It is well not to have too many specimens mounted on one cast!* A wide assortment of show-pieces grouped on a single cast may confuse and frighten a person who is utterly unused to looking at such things and therefore jumps to the conclusion that his mouth is going to carry the same amount of jewelry shown on the cast—when you get done with it.

Specimen restorations should be carefully and individually mounted so that they may be shown to your Patient without any confusion or diverting of interest from the one problem under consideration.

If an extensive Bridge program is being considered as offering many more desirable features than the extraction of all remaining teeth and the installation of a full denture, the differences in usable biting stresses should be carefully gone into. Attention should be called to the fact that no outfit of full dentures can ever be counted on for more than Eighteen to Twenty-Five pounds of biting pressure, whereas it requires from Fifty to Eighty or more pounds to chew properly such ordinary articles of food as hard breads, meats, nuts, celery, head lettuce, etc.

An apt illustration as to *why* these differences in usable chewing stresses exist may be illustrated by calling to mind the picture of the differences in weight which a man could lift, first standing in comfortable well-fitting shoes, on a level floor, and then later standing barefoot, still on a *level floor, but on one which has been thickly strewn with Hickory Nuts or small marbles!* The actual muscular strength of the man would be the same in both instances of course, but with the Hickory Nuts under his feet his strength would be rendered almost useless by the pain which any attempt to exercise it fully would cause.

In a very similar way the Mucous Membranes of the mouth and the many minute glands embedded therein render it impossible to exert the full power of the jaw muscles when complete artificial dentures are being worn. The attachment of a Natural Tooth Root to the Natural Jaw-Bone is the only thing thus far discovered that will comfortably withstand the full force of the powerful jaw muscles in chewing. (As a joking side remark the statement may be made that no one in all the World has ever been arrested for injuring any one by biting him with full upper and lower dentures, while almost every popular Bathing Beach acts as the last resting-place of several sets of teeth each Season.)

In my own practice, a few months ago, a Traveling Man returned to his room late in the evening. His upper plate was feeling out of sorts, so he removed it, cleaned it carefully and then deposited it on the wash-stand for a few moments' well-earned rest while he availed himself of the opportunity for relief afforded by an adjoining Bath-room Fixture. The said relief having been satisfactorily accomplished, the small lever was thrown to one side—as is quite customary in such cases—and the T. M. reached for his teeth—with not a care in the World. Here the Pic-

ture Changes—for instead of grasping said teeth as was intended, he foozled his shot and knocked the teeth into the swirling water in the base of the aforesaid Bathroom Fixture!! His "Full Upper" is now resting somewhere in the bed of the Illinois River, and over its quiescent cusps sweeps the Commerce of the newly created "Lakes-to-The-Gulf" Waterway! Of course this particular illustration is one which cannot be used indiscriminately, but in the case of just the right Man it could easily carry a clinching argument in favor of Dental Restorations which did not require removal.

Many important points are more susceptible of proof by means of Photographs of actual cases than in any other way, and it is not so difficult to secure such pictures as might be imagined by those who have never tried this simple procedure. The matter of the pictures and their use should be put to the Patient in the broad light of a Service to others who will apply for relief as they themselves have recently done. It is by no means unusual to have Patients who are especially pleased with some very extensive or unusual restoration volunteer their services in the form of a personal visit to the office in order that their work may be shown to some one who is in doubt as to just how the actual finished result will look. It is often quite amazing to see how far the feeling of gratitude will carry even a beautiful and sensitive Woman to be thus willing to reveal her own misfortune fully in order that by so doing she may help some one else to that measure of relief which has proved so satisfactory in her own case.

The results secured by each High-Grade Dental Restoration are very positive in their nature, and the probable outcome of each procedure can be stated with assurance before any work is started. *Extravagant promises should never be made* and are, as a matter of fact, entirely unnecessary, for the SIMPLE TRUTH ABOUT GOOD DENTISTRY IS GOOD ENOUGH! However, if there is any unusual risk involved or any prospect of a lessened period of service from the work proposed, such features should be carefully gone into *before* the services are rendered rather than afterward.

COMPLETE FRANKNESS ON THE PART OF THE DENTIST HAS AN ALMOST MAGICAL POWER OF CARRYING FAITH AND CONFIDENCE TO THE MIND OF THE PATIENT.

The terms *Good Dentistry* and *GOOD DENTAL SERVICE* have been rather freely employed in this Series.

What do these terms really mean?

What should be regarded as worthy of inclusion within their intangible but Magical Boundaries?

These questions and others along the same line will be taken up immediately and answered as frankly as a wide experience with Assorted Dental Disorders will permit.

534 Jefferson Building

Dental Research*

By JESSE L. LEFCOURT

School of Dental and Oral Surgery, Columbia University, '31

The ability of a profession to advance itself, to increase its knowledge and field of endeavor, is a measurement of that profession's standing in society. Without research the profession is at a standstill—there is stagnation, darkness, blind groping, leading nowhere. With research comes forward marching, advance into the future, with constantly increasing knowledge and confidence. With proper dissemination of the results of research there is a raising of the position of the individuals forming the profession, and consequently that profession becomes broader-minded, surer and wiser.

The research worker is of two types. There is the one whose extreme satisfaction can come only with discovery of new facts, methods and possibilities. He delights in robbing nature of her secrets and determining answers to all the questions of her laws and actions. Then there is that one, observant, alert, who follows out every diagnosis and every treatment with great precision, making accurate notes of methods, data and results and from these compilations finding generalizations, new ideas, new and better technics.

Both types of research workers are very necessary. Every man in the dental profession should fit somewhere in these groups. But, unfortunately for dentistry, there are so many men, hard-working and conscientious, who lack the faculty of imagination, a little foresight and observation, who continue in the same narrow pathway—a slow, steady pace on a backward-revolving treadmill.

There are two types of research necessary. One is in the field of repair and cure, the other in prevention. The profession has advanced readily on its reparative side and has been quick to determine methods to combat existing oral conditions. This field, mainly mechanical, has completely overshadowed the quantity of original work in prevention, the elimination of causative factors of dental abnormalities and pathologies.

How much does the dental school influence the student as a future contributor to the new in dentistry? The student's training undoubtedly will greatly affect his efforts in the direction of research.

Students naturally follow the examples set by their teachers, looking upon them as the finer types in the profession. It appears that students are more active in attempting original work in the departments whose heads and assistants are themselves actively engaged in making new contributions to dental science.

Then there is the necessity of encouragement to the newcomer in research. Naturally his progress is very slow; his learning is largely trial and error, which diminishes greatly with

* Written for the course in the Theory and Practice of Dentistry.

experience and proper guidance. A few kind words and a helping hand by a friendly teacher have a remarkable bolstering effect upon the beginner, who so often has his pitfalls.

Facilities that are given the students by the school greatly affect the interest in research taken by the future dentists. The finer and more complete the equipment, the greater the desire and the accomplishment.

The time element is a very important factor with the students. With the many necessary dental requirements the students find that they are unable to give up much time to outside research. And, since any small problem requires a seemingly large amount of time, the student is almost unwilling to bend any effort toward original work. But, if he assigns himself a small task and applies himself in the hours set to work upon it, whether he is able to accomplish his purpose or not, he has already acquired that taste or instinct or desire for more and deeper delving into the hidden. He no longer requires coaxing in that direction; he seeks it himself.

Dentistry lags very greatly behind medicine in the quantity and quality of original investigation. Since it is my belief that the professional schools greatly influence the future of research, let us look into the medical schools and dental schools in regard to this factor.

Vigorous activity in research is to be found in the medical schools, whereas only very little exists in the dental colleges. The teachers in the medical schools are aggressive and enthusiastic in the pursuit and solution of problems of the medical sciences. There exists a lively interest in the factors and influences that constantly affect health and the causation of disease.

In the dental schools, however, the interest lies in another direction—that of technics, appliances and methods. There has been only a slightly felt current in the direction of prevention. Very recently, however, the dental profession has begun to realize the importance of this situation. There is a buzzing of activity in the direction of prevention, with the dental schools the centers of this activity.

Several reasons could be given as to why medical research has advanced so much more rapidly than that in dentistry. First, there is the fact that the lay people have not been educated to dentistry as they have been to medicine. Consequently the financial assistance to medical institutions far exceeds that to dental schools and foundations, which greatly handicaps dentistry. Much of the dental research has been accomplished under commercial influences—relatively little in dental schools. Either the dental schools have had few funds, or, having funds, their faculties have failed to show the urgency of biological research for the promotion of dentistry.

Then, again, universities have been far more interested in their medical units than in their dental schools. Undoubtedly this is because medical schools have been affiliated with universities much longer than have dental colleges.

Another factor lies in the type of men of which the professions consist, the students, practitioners and teachers. In the medical profession there has been a higher plane of general education, a greater appreciation of health and

health service, a broader view of the application of related sciences, and a greater foresight and vision. But, like the other reasons for medicine's superiority in research, due to greater realization of the affiliation of dentistry with medicine, this one also is definitely becoming weaker.

As dentistry is progressing, so is the medical profession becoming more interested in it and its problems. Formerly giving no support, that profession is now aiding dentistry very greatly and is showing more interest, greater confidence and cooperation, and this will finally culminate in the integration of the two professions into one, whose purpose shall be ideal health service.

[FADS]

Human nature is so constituted that new ideas or methods that appeal to the popular fancy are played up and exploited in such a way that their importance is magnified beyond all reasonable limits. Scientific and professional men are only human, and many of them have become notorious as hobby-riders. This may be the way of progress, but one would prefer a more orderly advance. The hobbies that have been ridden by dentists are legion. There are hobby-riders in preventive dentistry as well as in restorative dentistry, and we have also had our hobby-riders in bacteriology and pathology and in nutrition.

—SECCOMBE.

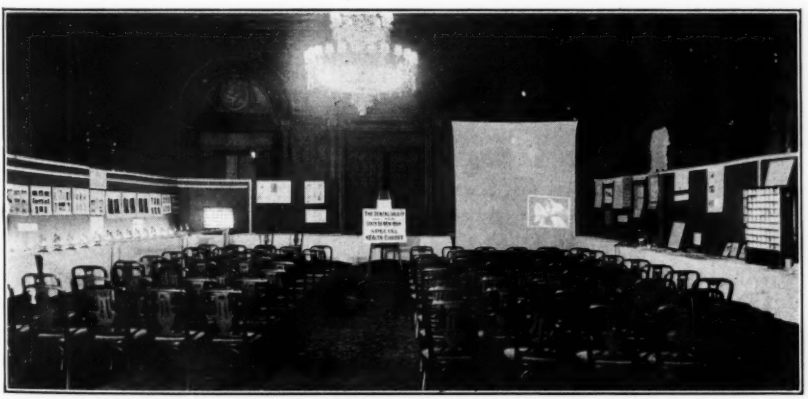
An Outline of a Special Health Exhibit at the Sixty-Third Annual Meeting of the Dental Society of the State of New York

New York, May 12-15, 1931

The purpose of this exhibit was to show the relation between wise nutrition and oral health on one hand and between unwise nutrition and oral pathology on the other. Eleven institutions and individuals made presentations, as per the list which is given at the end of this article. This is not intended to be a technical presentation of any exhibit, but merely to give some such impressions as a casual visitor might get.

The exhibit was held in a large room on the street floor of the Hotel Pennsylvania, New York, where it was readily accessible to the general public, and guests of the hotel were encouraged to become visitors, which many of them did.

Immediately upon entering the room from the hotel floor one came to an exhibit by Drs. H. D. Pease and O. M. Wolf which showed that milk alone is not a sufficient food upon which to maintain the best of health. They showed that the teeth of a white rat, when upon a well-balanced ration, are brown in color. When milk is given as the only food, both gums and teeth become blanched. If beef liver or oysters are added to the milk, the deficiency which occurred when milk alone was food is corrected and the teeth return to normal color. By means



General view of Health Exhibit—Meeting of the Dental Society of the State of New York, May 12-15, 1931.

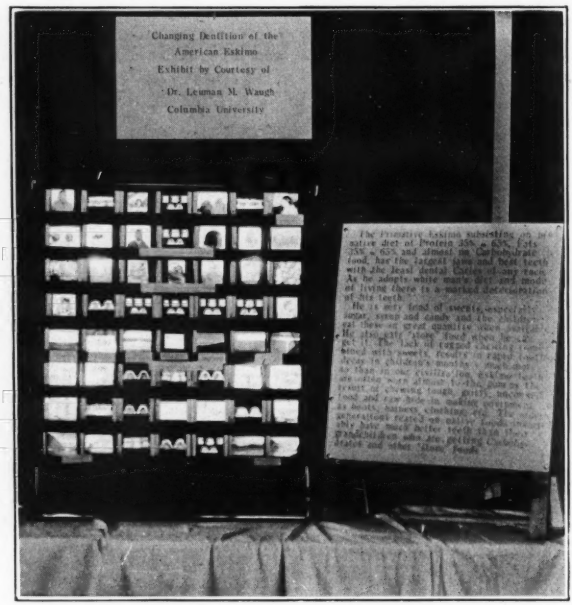


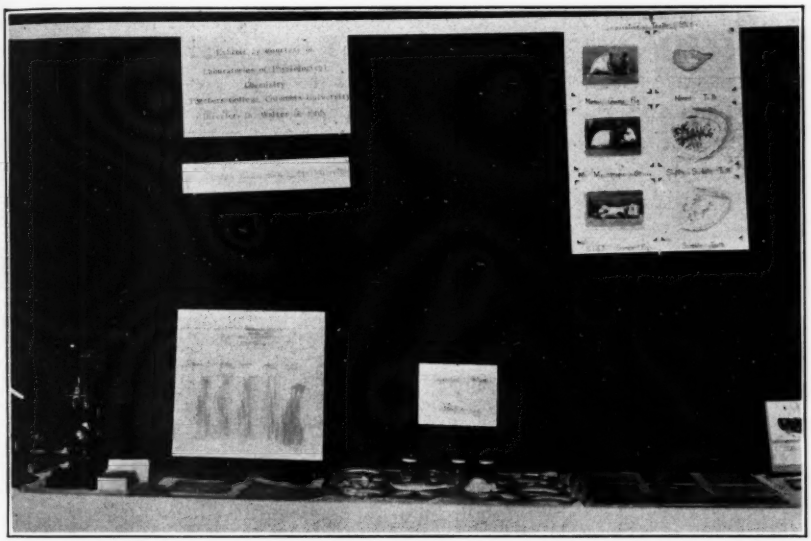
Exhibit by Leuman M. Waugh, D.D.S., Columbia University.

of a series of experiments which could not be shown at this exhibit it has been discovered that the return of the teeth to normal color is in proportion to the amount of iron, copper and manganese in the foods which are added to the milk.

Adjoining the exhibit by Drs. Pease and Wolf was a most instructive exhibit by Milton T. Hanke, Ph.D., of Chicago. This exhibit showed some of the results which occur when Vitamin C is deficient in the food but is not entirely lacking. This showing confirms the early work on this subject by Howe. Hanke found, as Howe had previously found, that orange juice is the best source of Vitamin C. Some of the most beautiful colored slides ever shown of oral conditions formed an important and pleasing part of this exhibit.

This exhibit taught a most important lesson in the fact that an animal may receive Vitamin C, but that if the quantity it receives is not equal to its requirements, degenerative changes will begin. If the amount of Vitamin C is increased to be equal to or in excess of the animal's minimum requirements, the degenerative changes will be arrested.

By means of wall charts Dr. Hanke presented analyses of the more important food elements in milk, eggs, citrus fruit, fruit generally and vegetables and made the suggestion that meat, bread, cereals, etc., should be limited to quantities suitable to the individual requirements.



Part of the exhibit by the Laboratories of Physiological Chemistry, Teachers' College, Columbia University—Dr. Walter H. Eddy, Director.

By means of colored lantern slides mounted upon a shadow box Dr. L. M. Waugh showed some of the interesting and instructive results of his studies of jaw formation and tooth conditions among the Eskimos in Labrador and Alaska. The primitive diet of these people generally contained from 35% to 65% of protein, with practically no carbohydrate and certainly no refined carbohydrate such as we in this country have today. Upon this diet the Eskimo presented the largest jaws with the smallest incidence of caries known to any race. Contact with white men has resulted in increasing the percentage of carbohydrates in the Eskimo's food, especially in forms of refined sugar, white flour, syrup and candy. The result of the intake of this greatly increased percentage of refined carbohydrate food, together with the lack of the hard chewing which was necessary with the primitive diet, has resulted in rapid degeneration in jaw forms and has greatly increased decay of the teeth.

McCollum and Klein, Johns Hopkins University School of Hygiene and Public Health, made a very fine exhibit with a series of instructive wall charts and sixteen microscopes with slides. The purpose of this exhibit was to show the relation of tissue effects in experimental animals to a diet unbalanced in mineral content, such as a diet low in calcium and high in phosphorus or low in magnesium and high in fluorine. Even a casual observer could not visit this exhibit without forming the conviction that disturbances of nutrition are active causes of dental defects.

The Laboratories of Physiological Chemistry, Columbia University, under the direction of Dr. Walter H. Eddy, presented an exhibit showing the relation of Vitamin C to dentition. An especially interesting wall chart showed that upon a diet only slightly deficient in Vitamin C scorbutic destruction of tooth pulps might occur without microscopic evidences of scurvy. Foods were very cleverly arranged to enable visitors to see what quantities of each were required to give equivalent portions of Vitamin C.

Another chart showed the effect of different doses of Vitamin C upon growth in guinea-pigs. One was compelled to form the conclusion that a quantity of Vitamin C which was less than the animal's requirement resulted in retarded and disturbed growth, while a quantity of Vitamin C in excess of the animal's requirement permitted a normal growth.

Dr. Percy R. Howe, Director of the Forsyth Dental Infirmary, Boston, presented an instructive exhibit under the title *Gross and Microscopic Aspects of Vitamin and Mineral Deficiencies in Experimental Animals*. This exhibit consisted of a shadow box with 63 slides and some collateral information. Dr. Howe has often presented portions of this information before medical and dental societies. The close attention given this presentation by dentists and the public indicates that this may be an exceptionally effective way of presenting this instruction.

Immediately adjoining this exhibit by Dr. Howe was one which proved to be of great public interest. It was arranged upon the basis of information furnished by the Forsyth Dental Infirmary and food materials furnished by the Hotel Pennsylvania. Different foods were arranged in the quantities necessary to provide equivalent amounts of calcium. Many guests of the hotel visited this exhibit. Most of them were surprised to learn that 60 prunes or 30 apples or 34 servings of beef were required to equal the amount of calcium supplied by seven medium-sized oranges.

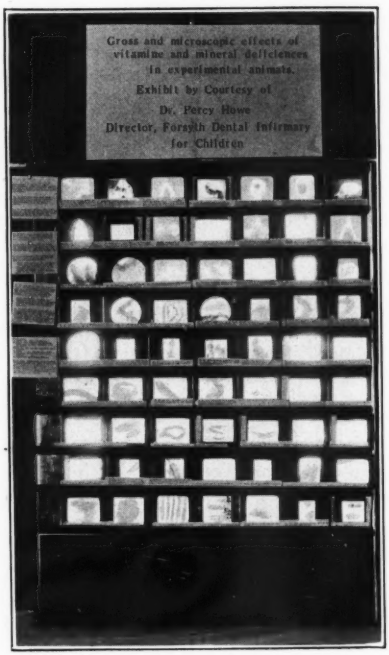
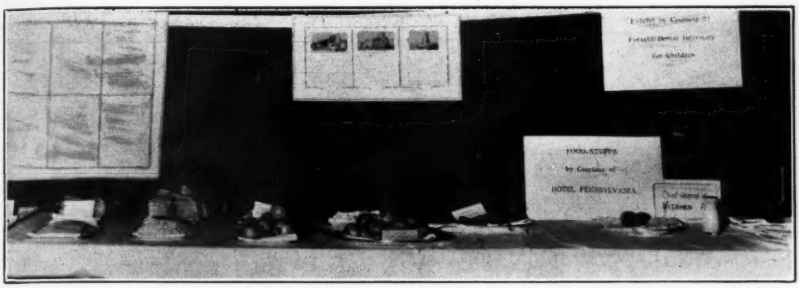

Gross and microscopic effects of vitamine and mineral deficiences in experimental animals.
Exhibit by Courtesy of
Dr. Percy Howe
Director, Forsyth Dental Infirmary for Children

Exhibit by Percy R. Howe, D.D.S., Director, Forsyth Dental Infirmary for Children, Boston, Mass.



This illustration shows how the Forsyth Dental Infirmary and the Hotel Pennsylvania cooperated to place dietetic knowledge before lay visitors in readily understandable form.

EXHIBITORS

Relationship of Vitamin C to Dentition—Dr. Walter H. Eddy, Director, Laboratories of Physiological Chemistry, Teachers College, Columbia University.

Dr. Milton T. Hanke, Department of Pathology, University of Chicago.

Gross and Microscopic Aspects of Vitamin and Mineral Deficiencies in Experimental Animals—Dr. Percy R. Howe, Director, Forsyth Dental Infirmary for Children, Boston.

Dr. Alfred Hess, New York.

Some Fundamentals in Dental Health—Dr. George Wood Clapp, Editor, THE DENTAL DIGEST.

Drs. E. V. McCollum and Klein, School of Hygiene and Public Health, Johns Hopkins University, Baltimore.

Studies on Susceptibility to Dental Caries—Columbia University, School of Dental and Oral Surgery. Castle Films.

Changing Dentition of the American Eskimo—Dr. Leuman M. Waugh, Columbia University.

Forsyth Dental Infirmary.

Child Welfare Association.

Color of Teeth in Anemic Rats on an Exclusive Milk Diet and Changes in Color Produced by Certain Dietary Additions—Drs. Herbert D. Pease and O. M. Wolf, New York.

DIGESTS

DIETARY PRESCRIPTIONS BY DENTISTS

By JOHN ALBERT MARSHALL, D.D.S., Ph.D.

Opinion seems to be divided among the dental profession as to whether or not the dentist should give dietary information to his patients. In some cases it is difficult to draw the dividing line between the practice of medicine and dentistry.

Dental caries is not a simple thing, and the oral bacteria are not the sole etiologic factor. The author states that there are probably five factors concerned in certain types of dental pathology: (1) anatomical, (2) bacteriological, (3) chemical, (4) dietary, (5) endocrin.

It is impossible to say which factor is the most important, but it is known that diet plays a not insignificant part. Changes in diet should not be made in a haphazard manner, but a more cordial cooperation should be secured with the patient and the physician. Unfortunately this is not always possible and in such cases the dentist may recommend a choice of food, but any further instructions should be left to the physician.

The prescribing of a diet must always be left to the physician, since it should be based only on the careful study of data gathered by laboratory and clinical methods.—*The Dental Cosmos*, September, 1931.

ETHYL CHLORID

By MARK NEWGARDEN, D.D.S.

The author recommends the use of ethyl chlorid for short operations on children and cites its wide use abroad and in the large clinics, such as the Forsyth.

The question of safety brings up a difference of opinion, though many men believe that the risk is greatly exaggerated. Mortality statistics are misleading, because only a small proportion of anesthetic deaths is reported, it is impossible to find out how many anesthesias have been given, and there is no standard for determining what constitutes an anesthetic death.

Some of the advantages of ethyl chlorid are the ease of administration, the absence of vomiting, salivation and trismus, and the rapid return to consciousness. The period of excitement is short and there is no cyanosis nor swelling of the tongue. The apparatus is simple and inexpensive.

The signs of complete anesthesia are: complete loss of reaction, regular, deep respiration; disappearance of conjunctival and corneal reflexes, eyeballs fixed and rolling downward; face flushed. The administration should not continue

after this stage has been reached, since the anesthesia deepens for a couple of minutes after the inhaler has been removed. — *Dental Items of Interest,* September, 1931.

TO CURET OR NOT TO CURET

By MENIFEE R. HOWARD, D.D.S.

As a rule in acute cases sufficient drainage is established by the removal of the tooth, but the dental granuloma is directly connected with the body, and unless it is eradicated, drainage continues and a residual area frequently results.

The absence of local symptoms does not mean that no infection is present nor does a negative x-ray prove the absence of infection. All cases of surgery in the mouth should be examined by the x-ray before and after operating.

Judicious curettage saves time and accomplishes what nature does over a long period of time or fails to do at all. When properly done, there are no post-operative complications such as fever, swelling, pain or other inflammatory reaction.

In reply to 85 inquiries, only three were skeptical regarding curettage, the rest being in favor of it when skillfully done. —*The Journal of the American Dental Association,* September, 1931.

Foreign Dental Literature

Edited by JOHN JACOB POSNER, LL.B., D.D.S., New York, N. Y.

INFLAMMATION OF THE MUCOUS MEMBRANE OF THE MOUTH

By ALBIN HENTZE, Kiel, Germany

The mucous membrane of the mouth is not merely a covering for the mouth, but it must be regarded as an organ that is closely related to the other organs of the body. It may be influenced by changes in other parts and contributes to the protection of the individual. The fact that many infections and illnesses are shared by changes in the mouth is illustrated in scarlet fever, typhoid, lues, and in mercury, tin and salvarsan poisoning. The mucous membrane of the mouth may be regarded also as a protective organ against infective processes. It is also possible that diseases of the mouth such as chronic tonsillitis, pyorrhea and chronic stomatitis may lead to systemic disease.

LOCALIZED ULCEROUS STOMATITIS

Strangely enough, many cases of stomatitis have been found following the long-continued use of cotton rolls in a patient's mouth. Interference with the normal secretions which bathe the mucous membrane is held to be the cause. The cotton roll itself is sometimes to blame because of certain chemicals used in the bleaching process. Traces of these chemicals act as irritants.

Aphthous Stomatitis

In aphthous stomatitis there is an exudate between the epithelium and the mucosa and a thickening and darkening of the epithelium. An ulcer also is present, seen on the surface epithelium. It develops in a day and lasts from six to ten days. The location of the ulcer is usually the mucobuccal fold. As a rule there is but a single ulcer, which is not contagious. The infectious type is found among children. It has been found that there may be at times an epidemic of stomatitis, and this has been traced to milk. This also explains the greater frequency of these ulcers in children.

Stomatitis Hypertropica

In this type of stomatitis there is an abnormal increase of the gum tissue. It is a combination of inflammation and new growth. It is supposed to be caused by some endocrin derangement. Surgery whereby the hypertrophied gum tissue is removed right to the bone is the best means of treatment. The gum may be removed by diathermy.

Formalin Injury to Tongue

A case is reported of a severe ulcer on the tongue caused by the introduction of tricresol formalin into a root canal as a dressing without sealing it. The patient developed severe pain on the side of the tongue, which interfered with eating and smoking. These unpleasant symptoms disappeared with the removal of the drug from the canal.

In another instance a dentist placed some tricresol formalin in an upper tooth and cemented it in. After the lapse of several hours a rash appeared all over the body, and the patient, who by the way was the dentist's wife, had to go to bed. A half-hour after the removal of the treatment in the tooth all symptoms quickly subsided.—*Die Fortschritte der Zahnheilkunde*, August, 1931.

MOUTH HYGIENE

Tooth-Cleaning Preparations

By Wilhelm Herrenknecht and Curt Scheidt, Freiburg

The value of any toothpaste or powder lies in its ability to clean the teeth mechanically and remove any agents from about the teeth which tend to produce caries. It was found that many toothpastes are composed of calcium carbonate and tricalcium phosphate. These are not fully dissolved in the saliva of the mouth. Several days after they were used, they could still be recovered from the pockets about the teeth. As foreign bodies they might injure the teeth.

As an experiment Naeslund filled the tooth pockets of certain dogs with calcium carbonate and tricalcium phosphate. On the other side of the mouth he used calcium bicarbonate. It was found that calcium bicarbonate was the only one dissolved completely. Calcium carbonate is safer to use in toothpaste than tricalcium phosphate, as the latter is capable of injuring enamel.

All forms of dental soaps are criticized for their injury to the gums. The germicidal action of a toothpaste is of no value, but succeeds only in producing harm to the soft tissues. The

attempt to change the reaction of the saliva by means of toothpastes has been unsuccessful. So has the attempt at mouth sterilization by the use of toothpastes and mouthwashes, as the longest action of any did not exceed twenty minutes.

NUTRITION

Nutrition plays an important part in the battle with caries. The chewing of coarse foods does a lot to clean the teeth and improves the circulation of the blood in the gums, mucous membrane and pulp. There is also an increased flow of saliva, which exerts a beneficial effect on the teeth.

All these favorable qualities in rough foods are lost when the food has been refined. Coarse bread is therefore recommended. All coarse vegetables also are favored, particularly when eaten raw, as they afford an excellent cleansing medium for the teeth. They also have a high vitamin content and are valuable for that reason as well.

Many authors have found degenerative changes occurring in pulps which were not functioning properly because of malocclusion. Teeth which do not take part in mastication are more susceptible to caries than those which do.

Sticky foods are to be used sparingly, as they favor caries. Chocolate and other sweets encourage caries, since they increase the mucin of the saliva and tend to hold food remnants against the teeth with the production of lactic acid. A careful brushing of the teeth should follow the use of chocolate. Fruits which are slightly acid have a favorable influence upon the preservation of the teeth. The acid dissolves the mucin of the saliva and thereby prevents the adherence of food particles against the tooth structure with the danger of caries. Raw fruits have a beneficial effect upon the teeth in providing calcium salts.

It is readily agreed that the teeth of the offspring can be favorably influenced through proper food used by the mother. One of the best means of providing the necessary vitamins and calcium salts to the mother is fruit. Vitamin D is important and is to be found in butter, yolk of egg, milk, green vegetables, tomatoes, cod-liver oil. Children brought up on the bottle do not have such good teeth as those fed by the mother. Boiled milk loses some of the necessary vitamins, particularly Vitamin C.

Mother's milk has only one-half the calcium salts of cow's milk, but is richer in vitamins. Cow's milk has no Vitamin D, and Vitamin C is destroyed by boiling. Children should be given tomato juice in addition to bottled milk to make up the deficiency in diet. It is wrong to depend entirely upon a raw food and vegetable diet, as has been advocated by many. The best results are to be obtained from a mixed diet with a combination of some raw foods and others which are cooked.—*Die Fortschritte der Zahnheilkunde,* August, 1931.

ACID PRODUCTION OF VARIOUS TYPES OF BREAD IN MOUTH DIGESTION

By DR. J. A. BREITENMOSER, University of Berne, Switzerland

Despite all the work of investigators in the field of caries, it has not yet been

definitely determined just how caries occurs. The theory of Miller, which is a combination of chemical and bacterial destruction of tooth substance, is the one most commonly accepted. The importance of proper diet is not to be overlooked.

The author believes that the bread used daily by all people has a great bearing on the question of caries. In an experiment he placed a mixture of bread, water and sugar on a tooth and at the end of a week found that the enamel was opaque and soft. In experiments with saliva it was found that the saliva had no effect on the teeth. But when the saliva was mixed with bread, more than ten times the acidity was noted. Walkoff found that bread was a great source of acid production.

The author states the following:

(1) A careful examination of various types of bread was made in order to determine the acidity of the bread particles that cling to the teeth.

(2) All bread particles contain acid.

(3) Secondary acid is produced by these food particles and after 24 hours becomes a definite menace.

(4) Under the influence of the saliva this secondary acid develops quickly and after three hours has a pH of 4.7. After 48 hours it may reach 4 to 3.4. The pH for normal fluid like blood is set at 7, and everything above this is alkalin and everything below is acid.

(5) No matter what kind of bread is eaten, at the end of three hours the acidity is in the vicinity of pH 4.6 and is of great importance when its acidity is considered in relation to the plaque which is found on the tooth surface as a source of tooth destruction.

(6) The soft part of the bread reaches a slightly higher acidity than the crust of the bread. The difference is not so important as to be of value.

(7) In so far as bread is a source of acid and is instrumental in forming caries, no type of bread has any advantage over any other kind.—*Schweizerische Monatsschrift für Zahnheilkunde,* No. 6, 1931.

ANTHRAX OF THE FACE AND A STUDY OF THE TREATMENT OF STAPHYLOCOCCUS INFECTION THROUGH BACTERIOPHAGE

By Dr. Paul Ulrich, Chief of the Clinic, Faculty of Paris

Since the time when bacteria were first recognized as disease-producing organisms, attempts have been made toward their destruction. Serums and anti-microbe vaccines and antitoxins mark the steps in the battle with them. The vogue of vaccines is far from passing. There is, however, a newer method of fighting bacteria which tends to take first rank. It appears as if it will displace all other methods. It is known as *phagotherapy.* The originator of this method is Dr. d'Herelle. The word *bacteriophage* is used to denote the agent for the destruction of the bacteria.

It was observed that when the bouillon culture of certain colonies of staphylococcus was passed through a Berkefeld filter, some of these became transparent. Some of the filtrate itself,

free of bacteria and added to a culture, was able to destroy some of the staphylococcus. When this was filtered, some of the filtrate could be again taken and, if added to another culture containing bacteria, would kill these bacteria.

Starting with a filtrate of dysenteric bacteria obtained by passing the bacteria through a Berkefeld filter, d'Herelle took the filtrate which was free from bacteria and added it to a culture containing dysenteric bacteria. The filtrate succeeded in destroying the bacteria. The substance passing through the filter has the power of destroying bacteria and is called the *bacteriophage*. It consists of bodies, invisible in the microscope, existing among the bacteria as parasites. It is capable of reproducing itself indefinitely. A solution containing the bacteriophage is still active in dilution of one to a million.

This bacteriophage is efficient only against dysentery and coli bacteria, in typhoid and in all staphylococcus. Its action is of no value against streptococcus or where antiseptics have been used. d'Herelle established the fact that the active principle of the bacteriophage is a parasite antagonistic to bacteria. There is still much to be learned regarding bacteriophage, and it is of great importance to the dental profession as a means of fighting those deep infections of the face and neck which often prove fatal.

The author refers to several cases of anthrax infection, which is a most dangerous condition. It has a high mortality rate. In one instance of an eight-year-old child bacteriophage treatment was instituted. In addition to the drainage of pus in and about the mouth and jaws this treatment saved the child. Several of the most distinguished surgeons of Paris were present during the presentation of the author's paper and agreed that in bacteriophage there was present an invaluable means of saving life.—*La Presse Dentaire,* August, 1931.

PRACTICAL HINTS

THIS DEPARTMENT IS NOW BEING CONDUCTED FROM THE OFFICE OF THE DENTAL DIGEST. TO AVOID UNNECESSARY DELAYS, HINTS, QUESTIONS AND ANSWERS SHOULD BE ADDRESSED TO EDITOR PRACTICAL HINTS, THE DENTAL DIGEST, 220 WEST 42D STREET, NEW YORK, N. Y.

NOTE—Mention of proprietary articles by name in the text pages of THE DENTAL DIGEST is contrary to the policy of the magazine. Contributions containing names of proprietary articles will be altered in accordance with this rule.

Editor, Practical Hints:

Can you give the cause, suggest treatment or give any information on the following case:

The patient, a woman, 54 years old, had 28 teeth extracted between December 1930 and February 1931. The alveolar ridge and gum tissue seem to be in normal condition. As I did not do the extraction, I have only the patient's statement. She says that when the injection for the lower anterior teeth was made, the dentist informed her that novocain was used, and that after this injection her tongue became numb. The patient now complains of a severe burning sensation in the tongue and tissues over the processes. Also she claims to have a bitter taste in her mouth, especially after eating. The patient has never had dentures. She says that there is a rigid feeling on the ridges, but there is no paralysis.

V. E. H.

ANSWER.—It is not very probable that the trouble is due to a direct injury of a nerve, although of course this is possible. In this event it will be only a question of time before a cure is effected.

It is more probable that the trouble is due to a nervous disorder brought on by the extraction and possibly increased by the lack of dentures. Dentures might help, and it would probably be advisable to put her under the care of a good physician.

Editor, Practical Hints:

I am having a lot of trouble with nerve pastes. My usual method of using is to place a pledget of cotton moistened with phenol compound, then on top of it apply the devitalizing paste, seal with cement and leave it for two days. When opened the tooth is not vital, but after sealing in formocresol for the next four days the tooth becomes vital again and I have to use devitalizing paste again about eight or ten times and, besides that, the tooth starts to ache.

If you have any information, I shall greatly appreciate it.

G. I. B.

ANSWER.—At the present time devitalizing pastes are used very little, owing to their uncertainty of action and disagreeable after-effects. Most pulps can be removed under local anesthesia with far better results.

Editor, Practical Hints:

A patient, aged 55, with recent extractions and mouth in splendid condition for plates, complains of an excessive sweet taste in his mouth, particularly beneath the upper lip. At times he has an exceptional flow of saliva.

Can you explain the reason for the sweet taste and the method for counteracting it?

H. S. T.

ANSWER.—It would seem likely that the sweet taste comes from the saliva and would indicate a disturbance in metabolism. An analysis of the saliva might show something. Of course, there are no taste buds beneath the upper lip, and he is getting a referred sensation. A general examination by a physician might be of value.

Editor, Practical Hints:

A girl, three years old, was brought to my office with a swelling due to a deeply decayed lower second molar. What would be the proper procedure to treat this case without resorting to a general anesthetic?

T. M. T.

ANSWER.—If general anesthesia cannot be used, then the only alternative is the use of novocain. Success by this method is extremely doubtful. It would be better to refer the patient to a specialist for general anesthesia.

Editor, Practical Hints:

Will you kindly differentiate between pericimentosis and exostosis and give the prognosis of each type?

This case in particular involves eight teeth with marked, enlarged roots. Seven are vital; one is devitalized with a fairly good root-canal filling and a slightly rarefied area.

H. L. H.

ANSWER.—We can find no such word as "pericimentosis." There is pericementitis, which, of course, means an inflammation of the pericemental tissues.

As a rule, exotosis is associated with non-vital teeth and is a reaction to some stimulus, generally pathologic. In the case you mention, there would seem to be no need for interference at the present time, especially if the patient presents no systemic symptoms.

Editor, Practical Hints:

M. C. C. asks you certain questions on the relation between pulp-stones and eye trouble. You state that "the impairment of vision would probably come only from infection." Are not pulp-stones almost always infected? I have cultured some 300 and have always had a streptococcus growth. Some were incubated at our dental college and others in a pathologist's incubator. Sometimes a very slow growth has been noted, anywhere from 48 to 168 hours.

The history given is not very complete, as it does not state at what age the eye trouble developed. However, if one of the pulp-stones were removed antiseptically and cultured, and if a

growth resulted, a vaccine made from this culture might aid in a diagnosis by raising the resistance of the body to that type of infection, and if this infection is attacking the eye, relief may be noted or some change at least.

In regard to the impacted molar—are these not always infected? I have a boy now 14 years old. The third molars were pressing other teeth out of alignment and were removed for that reason. During the last year this lad has suffered from rheumatic pains in his joints, especially after an attack of "flu." This had pretty well cleaned up when I extracted the left lower third molar. That afternoon he had excruciatingly acute pains in his joints. This passed away, but came back again after the extraction of the right lower third molar. The upper third molars are still to be heard from, as they will not be extracted till September.

L. Gerald Smith, L.D.S., D.D.S.

A SUGGESTION. — When instructing the patient to keep the mouth open, to keep the field dry, and to be sure that he does not forget and close, I simply lay the mouth-mirror crossways of the mouth and as far back on the lower lip as it will go.

The psychology of an object between the lips prevents that moment of forgetfulness in which the patient closes and gets the field wet.

Wm. Theodore Scholl, D.D.S.

DENTAL SECRETARIES and ASSISTANTS

Secretaries' Questionnaire

All communications should be addressed to Elsie Grey, care of THE DENTAL DIGEST, 220 West 42d Street, New York, N. Y.

NOTE—HAVE YOU A BETTER WAY? HAVE YOU A TIME-SAVING SHORT-CUT? DO YOU KNOW A "STUNT" THAT LIGHTENS THE WORK OR MAKES FOR GREATER EFFICIENCY IN THE OFFICE? IF SO, WRITE TO ELSIE GREY. YOU MAY HELP MANY GIRLS WHO ARE BEGINNERS—AND YOU KNOW HOW YOU NEEDED HELP DURING YOUR FIRST FEW MONTHS IN A DENTAL OFFICE. PERHAPS YOU NEED HELP NOW. WRITE TO ELSIE GREY—SHE WILL HELP YOU.

Dear Miss Grey:

May I suggest the following for the sterilization of burs:

Use an ordinary drinking glass containing a solution of one part of lysol to five parts of water, place burs therein and let stand overnight.

I want to thank you for a very interesting and helpful column.

E. P., N. Y.

Many thanks to E. P. for her suggestion. May we amplify this by suggesting that all burs be brushed and thoroughly cleaned before being placed in the sterilizing solution. Cleaning burs after sterilization recontaminates them, and they would have to be sterilized again before use.

Dear Miss Grey:

I have been reading the different articles in THE DENTAL DIGEST each month and find some of great help in my work.

I should appreciate information on removing deposits caused by boiling water on the sterilizer and white porcelain pans.

P. P., Alberta.

ANSWER.—Scale and deposits will form on the inside of a sterilizer or other utensils if water containing lime salts is used, that is, hard water. The best way to prevent such a deposit is to use rain or distilled water.

For removal from the inside of the sterilizer, use a 10% solution of hydrochloric acid and boil for about 10 minutes. This will soften the deposit, and you can remove it with a brush or cloth. Then rinse out the sterilizer thoroughly with water in which bicarbonate of soda has been placed and last with clear water. Do not allow any of the acid solution to touch the outside nickeled parts of the sterilizer or it will eat the polish. If your pans are small enough, you can boil them in this solution or use a similar solution to clean them.

If rigid daily care of the sterilizer is maintained, that is, a good cleaning each day and fresh water used each day, scale may be obviated as well as rust. A bit of sodium hydroxid can be placed in the water if it is hard, but never use any form of soda if the sterilizer is made of aluminum.

Dear Miss Grey:

Will you please tell me what I can use to remove mercurochrome from uniforms?

Fairmont, Minn.

ANSWER. — To remove mercurochrome stains from colorless cotton or linen cloth, soak the stains in a 20% solution of chlorinated soda for two minutes, then add to this in an amount of about one-fifth of the volume of the soda solution a 5% solution of acetic acid and stir the stained parts around in this "bath" until the stains disappear. Then rinse thoroughly in clear water.

For stains on the hands or skin, use acidulated alcohol if the stains are fresh. For fixed stains, use hypochlorite followed by a dilute acid, then wash in clear water. A little cold cream or almond cream will be soothing as a finish.

Dear Miss Grey:

Despite my hardest efforts to keep the top and sides of the container in which we keep the liquid for the cement clean, I cannot. The cover does not fit inside the bottle but over it. Can you offer a suggestion?

ANSWER.—Alcohol should remove the stain about which you complain. Wipe the container with a piece of gauze saturated with alcohol each time it is used, being careful not to allow any of the alcohol to drop into the bottle. It will take constant care not to allow the liquid to harden on the top and sides, and using a dropper carefully in taking up the liquid will help as well.

Dear Miss Grey:

I am quite interested in dental work. Will you please tell me the qualifications required of a dental assistant?

M. M., Cal.

ANSWER.—You do not state whether you are already employed in a dental office and want to know more about your work or whether you are simply interested in what is required of an assistant with the view to entering dentistry.

Briefly, the requirements are a foundation of education such as high school would provide, a good personality, plenty of patience, determination and tact. The work itself can be learned only by personal application in a dental office or by training in a dental school which gives courses for dental assistants.

If you are employed, we suggest that you join the society for dental assistants in your city. To become an efficient assistant takes time.

Dental Assistants' Societies

EDUCATIONAL AND EFFICIENCY SOCIETY FOR DENTAL ASSISTANTS, FIRST DISTRICT, NEW YORK, INC.

The Educational and Efficiency Society for Dental Assistants, First District, New York, Inc., will hold its regular meeting on Tuseday evening, November 10, 1931, at 8 o'clock at the Hotel Pennsylvania, 32nd Street and 7th Avenue, New York.

A cordial invitation to be present is extended to the members of the dental profession and to their assistants.

BERGEN COUNTY (N. J.) DENTAL ASSISTANTS ASSOCIATION

A group of dental assistants of Bergen County, New Jersey, have felt for some time the need of an organization whose purpose would be to become better acquainted with the work that is before us and to follow the ideals set down by the American Dental Assistants Association. Therefore an organization meeting was held in May and resulted in the forming of a permanent association of twenty-one members, who have elected officers as follows: President, Vera Rehain, 17 Salem St., Hackensack, N. J., c/o Dr. Roy N. Morrow; Vice-President, Edith M. McDermott, R. N., 46 Anderson St., Hackensack, N. J., c/o Dr. C. J. Gallagher; Secretary-Treasurer, Emmerett Fordham, Bank Building, Palisades Park, N. J., c/o Dr. Edward Armstrong.

On September 11th the first regular meeting of the year was held at Dr. C. J. Gallagher's office in Hackensack. Mr. Crocker, of the Wilmot Castle Company, gave a very interesting talk on *Dental Sterilizing Technic.*

Regular meetings will be held on the second Friday of each month, September to May, inclusive.

COLORADO DENTAL ASSISTANTS ASSOCIATION

The Colorado Dental Assistants Association held a meeting on September 8, 1931, at 219 Republic Building, Denver. Miss Alice Olsen, our delegate to the meeting of the American Dental Assistants Association in Memphis in October, presented a most interesting clinic on *Instruments and Their Daily Dozen,* which is to be presented at the national meeting.

During the summer months benefit bridge parties were a feature of the C. D. A. A. for raising delegate funds. These have proved very successful both socially and financially. Plans are now being made for a theatre party, which is being anticipated with great pleasure.

FAIRFIELD COUNTY (CONN.) DENTAL ASSISTANTS ASSOCIATION

The Fairfield County (Conn.) Dental Assistants Association has just been elected to the National Association and

is proud of the progress that has made it eligible for this admittance. The president is Selma Dahlgren, of Stamford, and the Secretary Ottilie Friend, of Norwalk.

The organization holds meetings on the first Monday of each month, at which speakers give instructive and valuable talks on a variety of subjects. During July and August the regular meetings were omitted, but social occasions afforded opportunity for get-togethers of the members.

BROOKLYN DENTAL ASSISTANTS STUDY CLUB OF THE SECOND DISTRICT

A meeting of the Brooklyn (N. Y.) Dental Assistants Study Club of the Second District will be held on Friday, November 6, 1931, at 8 P. M. at 62 Hanson Place, Brooklyn, headquarters of the Second District Dental Society. The topic of the evening will be *Demonstrating the Mixing of Cements and Silicates* and will be discussed by Mr. J. O'Shaughnessy.

The second meeting of the month will take place on Friday, November 20th, at 8 P. M. At this meeting Dr. Frank Nicolai, of Brooklyn, will favor the Club with an address on *Stone and Plaster Models.*

All members of the dental profession and others who are interested are invited to attend these meetings.

DENTAL ECONOMICS

The Economic Conduct of a Dental Practice

By BENJAMIN B. KAMRIN, B.S., D.D.S., Brooklyn, N. Y.

It is axiomatic that one of the most difficult things for professional men (dentists in this instance) to learn and apply is the fact that the practice of dentistry is a business as well as a profession. The professional side of dental practice consists of the treatment of diseased teeth and gums and the restoration of lost oral tissues, while the handling of accounts, calculation of costs and estimation of fees fall under the category of business. Proper consideration of the practice of dentistry decrees that these two factors be considered as one, for can one practice proficient dentistry without receiving sufficient compensation? The answer is self-evident.

The economic conduct of a practice may be briefly defined as the attainment of patronage and its subsequent retention. Under this heading it is necessary to consider all the factors that may conceivably contribute toward acquiring a lucrative and professionally successful practice. H. B. Washburn says that "dental economics, in a broad sense, involves the entire structure and organization of dentistry, its history, the educational methods employed, a clear understanding of what constitutes the work of the dentist, the relation between dentists, an evaluation of dental services and fees and standards of living; and, finally, dental economics must take into consideration the process of building up an estate against the inevitable time of decreased earning power."

Professional success has been variously defined, but all agree in the essence that such success implies the achievement of a desired goal—usually financial well-being. However, it must be definitely understood that the process of making money as the sole ambition of a practitioner marks that person as entirely unworthy of his chosen profession.

Louis D. Brandeis, Associate Justice of the United States Supreme Court, speaking of *Business—A Profession,* states that "success in business must mean something very different from mere money-making. In business the able man ordinarily earns a larger income than one less able. So does the able man in the recognized professions —in law, medicine or engineering; and even in those professions more remote from money-making, like the ministry, teaching or social work. The world's demand for efficiency is so great and the supply so small that the price of efficiency is high in every field of human activity.

"The recognized professions, however, definitely respect the size of the financial return as the measure of success. They select, as their test, excellence of performance in the broadest sense and include, among other things, advance in the particular occupation and service to the community. These are the basis of all worthy reputations in the recognized professions. In them a large income is the ordinary incident of success; but he who exaggerates the value of the incident is apt to fail of real success."

In harmony with these views this paper has been subdivided into the following heads: Personality, Location of the Office, Office Efficiency and Equipment, Educating the Patient, and, lastly, Fees.

Personality

After careful thought all will agree that personality is an imperative requisite in dental practice. In combination with cleanliness, which is the prime requisite for winning patients and keeping them, personality will maintain a successful practice in spite of mediocre technic, poor locality and indifferent equipment. Edwin N. Kent made a survey of dental patients on the question, "Disregarding any consideration of my operative ability, what is there, in particular, about me or my office that you would say is important in attracting your patronage?" Of the 500 replies received, "Cleanliness and Asepsis" stood first, "Personality" ranking second! "Moderate Fees" took fifteenth place.

Commenting on these findings, Kent remarks that a "magnetic personality is the most important of the dentist's stock in trade, outside of skill and cleanliness; and the samples are with him always. He will show this leader among his wares wherever he goes, to all with whom he comes in contact; he will place this item before the public whether he wants to or not. If his stock is attractive, he will win friends and followers without a word of shop-talk. Always, everywhere, unceasingly its qualities are being demonstrated whenever and wherever the dentist comes in personal contact with his fellows."

Some of us are almost entirely devoid of personality. Such persons present a dull and insignificant appearance, making no impression upon those with whom they come into contact. Such persons, if dentists, may have superior technical ability, yet they are never accorded their just due; for technical ability requires a demonstrable medium, but personality is superficially evident. However, psychologists maintain that personality may be acquired. With full realization of the importance of this quality it would repay many to apply themselves diligently to its study.

First and foremost, it is necessary that the dentist maintain a "straightforward manner, truthfulness in all expressions and a kindly consideration for his patients' mental and physical comfort. Such care will be reciprocated in their respect for the dentist's professional skill and gentlemanly manner." —Suter.

Secondly, although there is no typical ideal of personality, certain external expressive attributes form the nucleus for building an attractive personality. These have been expressed by W. W. Charters, of the University of Pittsburgh, in the following rules:

(1) When you talk to a friend, hear what he is saying with your mind.
(2) Make the other party talk by asking him intelligent questions.
(3) When you meet strangers, find out their interests by getting them to talk.
(4) Find out what other people like to talk about and talk about that.
(5) Forget yourself and become interested in other people. People are more interesting than anything else in the world.
(6) When you argue, try to get at the truth and be glad to acknowledge that your friend has given you a new idea.

Any personality when dissected and carefully analyzed will be seen to consist of the majority of the following attainable qualities (modified from Kent's *The Business Side of Dentistry*):

Enthusiasm. This attribute is of vast importance because it breeds confidence and conveys conviction by earnestness and sincerity. Enthusiasm is contagious.

Sympathy forms an unquestionably strong bond between dentist and patient. It may be called the magnetic form of character, for every patient desires the individual attention of the operator and wishes to think that his case is an entity in itself.

Originality. This is another name for individualism, which makes each personality stand out because of its own quaint setting and coloring.

Good Manners should be of the spontaneous type and not of the studied, pedantic form.

Dress. Since appearance plays such a dominant rôle in our lives, our attire should always reflect neatness and good taste.

Self-Confidence. It is as contagious as enthusiasm, for it inspires the confidence of others. This trait is not to be confused with conceit.

Cheerfulness. Patients have their own troubles and are not desirous of sharing the pessimism of the operator. "Laugh and the world laughs with you, cry and you cry alone."

In developing a pleasing personality learn to meet every emergency with a smile and bear in mind those words of Bruce Barton: "We get from people what we give; we find in them what we bring; and the changes are not changes in them so much as changes in ourselves."

Location of the Office

The first problem that confronts the young graduate about to establish a practice is the selection of a location. "The question divides itself into two parts: first, the opportunity in a given field for a dentist; second, the special fitness of a particular operator for that particular field."—Kent.

In attempting to determine the solution it must be acknowledged that each practitioner presents an individual problem. Each person differs in mental, social and physical qualities, which permit him to harmonize in certain localities and be a decided misfit in others. In the words of Suter, "it is essential that a dentist select a community for which he is temperamentally, financially, socially and professionally suited."

Some dentists are best qualified for establishing practices in large cities,

others are best adapted to suburban practice, and then there are those who would be most successful in very small centers of population. The dentist who is accustomed to and imbued with the environment, habits and traditions of Main Street will not be successful on Fifth Avenue. Another important factor to take into consideration is the nationality of the practitioner in relation to the dominant racial element in that particular locality.

There are also numerous physical characteristics to be considered in the selection of a location. First, one must consider the accessibility of the locality. Secondly, is the building of a professional type or of sufficient respectability to reflect the good taste of the dentist? Remember that an unattractive external appearance, dirty halls and unkempt neighbors form a formidable handicap. Outward appearances are usually taken as an indication of the practitioner's personality.

Office Efficiency and Equipment

The basic thought in every office should be as to what is the best system of treatment, considering economy of time, effort and expense. The time element is extremely important, and its profitable employment means building up a stable economic structure. Aside from the monetary value of the materials used in restorations, time is really the dentist's capital and, as such, should bring him an adequate return. The waste of time confines itself not only to rendering service without charge, such as examinations and temporary treatments, but also to slipshod and unsystematic methods and technics.

For the best service and efficiency the office should be fully equipped with practical and efficient instruments arranged according to a definite plan. This does not mean that the dental office should contain every innovation conceived by dental manufacturers as contributing toward dental progress. Many of the large, hypothetical-robot dental units may serve the costly purpose of impressing the patient, but they can be dispensed with from the viewpoint of practicability. In other words, the practitioner should select with expert advice the necessities for the practice of dentistry and have them arranged by a legitimate planning bureau. Most dental depots maintain such staffs of men, who through long contact with the dental profession and a fundamental training of efficiency are able to arrange the dental office for maximum results with a minimum of effort and expense.

Educating the Patient

For the best and greatest success in the practice of dentistry it is important to acquaint the patient with the value of scientific dental service. In other words, it is the utilization of one's personality, plus other efforts, to place the patient in a receptive frame of mind. The latter point is necessary, for the average patient still visualizes dental service in the parlance of advertising dental offices, that is, "One and half-dollar cleanings," "Plates made the same day the teeth are extracted," "Silver fillings for $2.00 and gold fillings for $5.00," and other similar terms. To these patients a bridge indicates so much gold, and a denture denotes other material values. Thoughts

of the service rendered is remote from their minds.

The young practitioner will render the patient an inestimable service if he will attempt to educate him to full-mouth radiography as a part of every examination. Service of this type will repay the practitioner three-fold: (1) he will make a finer diagnosis of the individual's oral condition; (2) it will eliminate the dental shopper, who asks estimates in order to compare prices with those of his colleagues; and (3) it will produce financial benefit to the dentist in addition to increasing his professional ability in the eyes of the patient.

Other excellent methods of educating the patient and thus increasing his evaluation of dental service are the use of models, samples and charts. Science tells us that the eye will carry impressions to our reasoning centers twelve times faster and twelve times more emphatically than the ear. Therefore the dentist should use the patients' eyes and give them *visual education.* Dentists, as a whole, should realize the tremendous importance of using various models which portray the patient's condition and on these models should explain and illustrate the restorative procedure planned. Proper demonstration of visual materials will make a far deeper impression than thousands of gushing words. It is only by such methods that the idea prevalent among the laity that dentistry is a luxury can be dispelled.

FEES

A great number of persons have lectured and written on the subject of fees. C. N. Johnson gives some excellent advice on the question of fees and an equitable basis for their establishment. He summarizes this controversial question by stating: "The only fair basis for making fees is a combination of the two ideas of charging by the time and by the operation, and on this basis an equitable adjustment of fees may be made that will be alike satisfactory to the patient and the practitioner."

Byrnes raised some very interesting and instructive questions in a recent lecture before a Georgia dental society. He asks: "Is there a plausible reason why dentists approach a common-sense basis in the establishment of fees for crowns, bridgework, gold inlays, silicates, partial dentures, pyorrhea treatment and x-rays and at the same time offer either gratis or at a ridiculously low fee their professional skill in mis cellaneous treatments, examinations, cleaning teeth, repairing dentures, extractions, cement fillings, children's work and pain relief? The manner in which fees for different operations were originally established remains a subject of deep and impenetrable mystery. Why, for instance, should a dentist make a mouth examination for nothing? Would a physician make an examination without a fee? If a mouth examination is not charged for, it must be concluded that it is not worth anything. Who, then, can blame the patient for not placing much value upon such an examination? Dentists in the past have not charged for it, hence too often it is made in a perfunctory manner. If it is not worth a fee, it is not worth anything and should be dispensed with."

Suter says: "In determining the fees the dentist should take into consideration the established hourly overhead of

operating the office, the hourly income to which he is entitled in order to guarantee him a desired annual income, the type of service he is to render and the type of patient to whom that service is to be rendered."

Conclusion

Of course, in a brief treatise of this type it is impossible to give a complete picture of the economic conduct of a dental practice. But, if I have aroused your interest sufficiently to make you understand the close interrelationship that exists between the professional and business sides of dental practice, I shall feel that I have accomplished my assigned task successfully.

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The Economic Significance of Our Attitude Toward Oral Disease*

By GEORGE WOOD CLAPP, D.D.S., New York, N. Y.

A while ago we studied very briefly the economic significance of oral disease to its victims.** We are now ready to consider with equal brevity some aspects of the economic significance of our attitude toward oral disease. Note the way in which that statement is phrased—we are to study not the significance of oral disease but the significance of our attitude toward it. To do that it will be well to bear in mind the following definition of economics:

> Economics is the science of man's well-being in relation to the material world about him, to his own physical and moral health and to his social relations to the family and community.

When most of us begin to think about economics, we think at once of dollars and cents. A reasonable quantity of these is necessary to physical and

* This is the eighth of a series of related articles. The first appeared in the January issue.

** See The Dental Digest, May, 1931.

moral health and proper social relations, but when we think of them as measures of success, that is something very different. For earnings and expense and savings, dollars are a good yardstick. But for the enjoyment that good health brings, for the delights of aspiration and achievement and pleasure with those we love, money is not a measure.

Suppose that we want to think of economics in terms of dollars and cents, saying to ourselves that if we have enough of them, we shall get the other things readily enough, an idea by no means sound but very prevalent. Could we not think of dollars and sense? And could we not, at least some of us, reverse the order of those terms and, stepping outside our own practices for a little while, inquire whether by getting more sense we might order our lives in such way as to get more dollars?

Let us go about this systematically by asking ourselves a series of questions, perhaps like the following:

What is financial success in dental practice?

What proportion of dentists are financially successful?

How do they attain success?

Why do the failures fail?

What is the public attitude toward dentistry and dentists?

Is our present procedure the best that can be devised?

Of course the answers must be general in character and short, but they may suggest something of interest.

Standards of Financial Success

There are no generally accepted standards of financial success in dental practice. Probably no standards in terms of money are possible. Yet the following requirements might be reasonable for the dentist 35 years old who has been ten years in practice:

Office equipment and furnishings good for his community and class of practice, and paid for.

Reasonable time and funds for continuously increasing his knowledge and skill.

A comfortable living, suited to a professional man.

Good business credit.

Reasonable money provision for his old age and for the family at his death.

How Many Are Successful According to These Standards?

There can be no authoritative answer to this question at present. Some are successful according to these standards in big cities, others in small towns. Some combine some sort of business activities with the practice of dentistry and pool the returns.

In one large city, where many dental fees are high, it appears that one dentist in three meets these standards of success.

Another group, comprising about one-third of the dentists in that city, seem to be clutching the fringe of the garment of success. Their offices are substandard in important respects. They have neither time nor money for post-graduate courses unless they are given in the evening and are free. They do not maintain good business credit, and their provision for sickness, old age and premature death is insufficient.

One-third of the dentists seem not to have laid hold on even the fringe of

success. Their offices are far below standard. Their credit is of the poorest. They have no financial hope in the present or for the future, so long as they stay in this class, as many of them do.

How Do the Successful Ones Succeed?

Largely through salesmanship. All the financially successful dentists seem to have one characteristic in common—they are all good salesmen. Some of them are wise in the profession of dentistry and skillful in the craft of it. Some of them are no more conscious of the professional elements of dental practice than a hen is of Sunday. Some are honest with patients; others are not. Some get high fees; some get only moderate fees. But all of them are salesmen.

They have found out how to make the right kind of personal contacts with people who will pay well, to enthuse them as to what can be done and to inspire conviction that they are the dentists to do it. Some of them have put themselves over with their profession trailing far behind; others have put their profession over with themselves as capable servants of it. But always they have put themselves over.

Why Do the Failures Fail?

On the other hand, those who are unsucessful seem to have one characteristic in common. They are not salesmen of dentistry or of themselves. They do not contact well nor inspire desire and confidence. They seem unconscious of the fact that even if there isn't much in them that is worth putting over, they have, ready at hand, one of the finest sales stories in the world to tell about what the profession of dentistry can do for young and old. They usually offer dentistry in its least attractive and most repellent phase, sometimes at fees above what their knowledge and skill are worth.

What Is the Public Attitude Toward Dentistry?

No one has authority to answer that for the public and probably no one answer could be sufficient.

By that portion of the public which can afford to pay well for all the dentistry it wants, and which is lucky enough to fall into the hands of dentists who are professionally wise and honest and technically skillful, dentistry is highly esteemed, often because it costs them so much. This element constitutes not more than 2% of the people of the United States in normal times—probably less now.

The next stratum of society may contain as much as 20% of the population, though that is doubtful. Those in the upper part of this stratum desire enough dentistry and good dentistry, but they generally find it financially unattainable, especially in recent years.

The lower parts of this stratum use dentistry as little as they can, and their average expenditures are too small to protect their health and efficiency or to offer any hope for dentists.

We have, then, two great groups, in one something like 90,000,000 people needing dental service and in the other about 40,000 dentists idle half their proper working time.

Is the Present Procedure the Best That Can Be Devised?

Some of us do not believe that it is. We feel that when a common or garden variety of dentist charges a waitress $150.00 for a lower partial denture on which a laboratory did nine-tenths of the work for $25.00, he is killing the goose that would lay golden eggs if treated properly.

The craft of dentistry is far too expensive to those whom it serves and not satisfactorily profitable to about two out of every three dentists who practice it. It waits for damage to occur and then repairs it. It is unconscious of causes and ignorant of prevention, except such as repairs prevent. It wins for those who practice it recognition as craftsmen, but nothing more, and arouses in those whose mouths are repaired only such enthusiasm as crutches arouse in a cripple. When the cost outruns the public's opinion of its value, dentists are left to twiddle their thumbs as many of them have been doing most of the time for the last ten years and more are doing now.

On the other hand, professional dental service is not expensive, especially if the patient is caught young or the expectant mother is caught before the patient exists. It seeks to secure good health for the whole body, and for the mouth as part of the body, and to anticipate and correct the action of causes that would do harm. Examination, prophylaxis and guidance are frequent. When the family will live according to simple principles which the dentist may suggest but which each patient must work out for himself, extensive damage necessitating extensive repair rarely occurs until the child goes away to school.

In adult mouths where extensive damage has occurred, the early steps of such a program are different in that the damage must be repaired and such replacements made as will permit efficient mastication. Note that not only must replacements be made, but they must be efficient and comfortable. That is not so simple as it sounds, but it is an essential. From that point the program is identical with that for the young folks.

In an office which is second to none in this country in the quality of its service and the completeness of its appointments this service has averaged to cost adults $5.00 per month, after the mouths were once in good condition, and youths $3.50 per month, except for damage incurred when away at school. These figures were especially prepared for me and cover several hundred cases over a period of seven years. They include three examinations and treatments annually by the hygienist and one by the dentist, with a $15.00 radiograph every two years.

It is entirely probable that in a city or town where the costs of practice and living are not so high as in the big city where this office is located it would be possible for a competent dentist, with a well organized office, to take care of the mouths of a family of four (father, mother and two young children), once the mouths were in good condition, for the sum of $10.00 per month, so long as they conformed to wise principles of living, with penalties for infractions. Some day some of us will have the wit to see that 100 families like this would constitute a delightful practice, with a

gross income from this source alone of $12,000 per year.

While we sit smugly entrenched behind our diplomas and licenses, very serious changes are in the offing. A substitute for the dental education we are not giving the public is being given by commercial houses having something to sell. Panel dentistry, insurance dentistry, state dentistry are all thrusting their shadows forward. For those dentists who cannot succeed "on their own" they will be blessings. For those who are clinging to the fringe of the garment of success they are likely to spell professional and financial ruin. From the point of view of the patient's welfare not one of them is equal to the plan which has just been suggested.

The economic significance to us of the attitude we have held toward oral disease during almost a century since the first dental college and dental journal were founded in this country is that the practice of dentistry as a means of livelihood is not sufficiently profitable to justify the expenditure of the time and money required in preparation and is not profitable enough to attract the type of men who would best advance dentistry, if they knew beforehand what they were getting into.

Dentistry as it is generally presented to the public and practiced is not profitable to the greater part of those who purchase it in anything like the way it should be. And it is available in that quantity which would most benefit the recipients to only a tiny fraction of those who need it.

Our position is very much like that of a man placed before a table loaded with good things to eat but with his hands chained fast to his sides.

Unless we alter our attitude wisely and effectively, others are likely to take control of the situation into their own hands and alter it for us.

That may not be good for the public or for us.

(To be concluded)

DIETETICS and HEALTH

John Thorpe Comes Back to Life

By A. L. WALTERS, D.D.S., Tulsa, Okla.

(Literary Collaboration by GEORGE WOOD CLAPP, D.D.S.)

John Thorpe, a typical American business millionaire, sat in his private office on the mezzanine floor looking out over as much of his great mercantile establishment as could be seen from that point. Behind him, on his desk, lay a letter which had come about an hour ago. He had read it once, then had rung for his secretary and said, "Miss Star, please see that I am not interrupted." Then he read it once more—carefully. He would never need to read it again. Every word of it was graven into his memory in letters that would not fade so long as he was capable of thought.

That letter had forced on him a new pair of mental spectacles. For the first time in years he was looking at the store without seeing stock and clerks and sales and profits. This time he was looking for life, and he was looking particularly at Peter Brown.

Forty years before he and Peter had entered the employ of the store that occupied that site. Both had climbed upward, but in different ways. Thorpe, who loved things, had become an unusual executive, while Brown, who loved people, had prospered less.

After some years Thorpe found himself the owner of the store which had grown into the present huge building. Brown became the head of the men's furnishings department. Under the pressure of many matters the old, intimate relationship between them had been forced into the background.

Now, in the twinkling of an eye, all was changed. Thorpe had been jerked with a ruthless hand from his immersion in affairs he had thought to be very important and brought face to face with life in its baldest terms. He suddenly found that Peter Brown typified life to him. What was Peter doing? He was moving quietly about the department, never far from the door. Thorpe saw man after man who was important in the life of the city come in, some of them associates of his in big affairs, go up to Brown with outstretched hands and a smile and pause for a few words before making their purchases. Frequently they brought a selection to Brown for a final choice. And they always bade him goodbye. Not one of them so much as glanced up to the office where Thorpe sat looking down.

What would Peter do at closing time? He would take the trolley to his suburb and walk to his modest home. At that season of the year, when winter had retreated and spring stood trembling on the threshold, he would change to an old suit and go at once to his garden. His youngest girl, six years old, would be waiting for him, her little pail and shovel ready. And she would help Daddy dig. Only last year she had come up to him when the garden was a riot of color and said, "Daddy, we have much better flowers than any one else. Is it because they know you love them so?"

What would happen for Thorpe the millionaire at closing time? A few minutes before, a beautiful limousine would park near the side door. When Mr. Thorpe appeared, the chauffeur would bow him into it, adjust the robe, touch his cap and drive him home to the mansion on the hill. The butler would admit him and, a little later, would bring him glasses and a tray so that he might mix a tonic to offset the labors of the day. He would read market reports. Dinner would be at seven, usually with the children and his wife present. They would greet him affectionately and then the young people would plunge into matters of which he knew nothing. His wife was busy upholding the social position of the family. Frequently he had business that took him out for the evening, at other times there was company.

Beginning a little over two years before the story opens, Thorpe had found it more difficult to work than it had been before. Strongly built, with an excellent physical heritage, he had resented such a condition and had put on a little more steam. But that answered for only a short time. After one period in which he found concentration nearly impossible, he consulted a physician. His condition was ascribed to overwork and too close confinement, and he was advised to let up a little, to get out of doors and take a tonic. After a third attack the physician referred him to a specialist. The letter on his desk reported the specialist's findings. It ran as follows:

Dear Sir:

We are forwarding the results of our findings to your physician, but, as per your request, we append suggestions for your guidance.

It is in the highest degree desirable that you should at once be relieved of all business responsibilities, and your personal affairs should be put into such form that their administration will be acceptable to you.

You should spend as much time outdoors in the sunlight as possible, but violent exercise is contra-indicated.

Travel might be agreeable to you, but you should take along some one who will spare you the irritations usually unavoidable.

If these recommendations are carefully followed, you may hope for three years more of life, and we trust that you will be able to make them not only comfortable but happy.

Yours very truly,

M.D.

And so this was the end of the planning and toiling in which he had been so happy for forty years. This great establishment, with its floors of merchandise, its hundreds of clerks and thousands of customers, was to be taken out of his hands and turned over to the administration of others. He must withdraw from the city-wide and nation-wide affairs in which he had had a part. Somebody must even stand between him and the little irritations which made part of every-day life. He thought of himself as rolled up in cotton and put up on a shelf to wait for death.

Thorpe found himself studying Peter Brown because he wanted to know what to do with his life during the three years for which he might hope. In the first place, such a letter wouldn't have come to Peter because he had lived what Thorpe perceived, for the first time, to be a well balanced life. But if it came, he could continue to shake hands with his friends and radiate sunshine and interest in their affairs. His children would have been wild to help him raise more flowers or go on more quiet picnics in the country. And every one of them would have been a buffer between him and the "irritations which are usually unavoidable."

* * *

When Thorpe had turned his great business over to others and withdrawn from outside interests, he began to benefit a little from the relaxation of mental tension, the sunshine and the fresh air. As he felt better, idleness began to pall upon him and his resentment against his condemnation grew, but there seemed to be nothing he could do about it. The man who had condemned him had made no suggestions, except to say that chronic constipation was the cause of his condition. His family physician had nothing to offer. He was simply to do nothing as well as he could for as long as he lasted.

While in this frame of mind Thorpe recalled a combat he had had with his wife's dentist. A few months before his visit to the specialist, when his mouth had been sufficiently uncomfortable to force itself on his attention, he had gone to this dentist for relief. The dentist had done what he could to make him comfortable and followed the treatment with some very definite suggestions about a connection between the mouth condition and his general health. He had even told him that unless he had a physical inventory made of himself and did certain definite things, it was quite likely that within six months he would be invalidated out of business. He counted back to the time of that interview. The six months were only a little more than up; the prediction had come true. That dentist was the only medical man who had seemed to have any definite ideas about his case. He would go again and talk to him; if the dentist were looking merely for a chance to run up a big dental bill on a sick man—well, Thorpe would be on his guard against that.

The dentist found the teeth nearly all present and, with the exception of some fillings and a few cavities, in good condition. But the condition of the gums was very different from that of health. There was a marked hypertrophy of gum tissue, so that in the back of the mouth it reached nearly to the grinding surfaces of the molars. A somewhat similar condition might have come from occlusal trauma, especially in a dentition inherently so strong as Thorpe's. When it was established that the occlusion was exceptionally good, it became apparent that the condition was the result of other causes, manifesting themselves in progressive degenerative changes which were making slow headway against a naturally high resistance. So he began to question Thorpe about what he ate and how he ate it.

Instantly all the resentment which Thorpe had been waiting to loose on

somebody poured itself out on the dentist. What had he to do with diet? That was something for a physician, and none to whom he had gone had more than mentioned it to him. His business was to fix teeth, and if he could improve the condition of his mouth, he might go ahead and do it. Anyway, this talk about diet was all "bunk."

Somewhat to his surprise Thorpe found the dentist, at the end of his tirade, just where he had been at its beginning and showing the effect of his vehemence only by a noticeable tensity of manner. Speaking a little more forcibly than he might otherwise have done, the dentist said: "A few months ago, Mr. Thorpe, I told you that you were headed for physical disaster. I don't know what you've done about it, but the condition of your mouth shows that disaster to be nearer now than it was then. Personally it is of no importance to me whether you live or die, but I know that you have a fine family because I serve some of them. I know that they think the world of you, and I should think that for their sakes, if not for your own, you might use a little common sense. I say to you even more strongly what I said before, that it is of the utmost importance for you to have a thorough physical examination immediately and govern yourself by its findings."

If Thorpe had been normal, that advice would have commended itself to him, but he was far sicker mentally and physically than he knew and after some more pretty strong remarks he went away resentful.

When he had time to cool down and reflect, the appalling accuracy of the dentist's predictions and the fact that he had definite ideas where no one else had any and the courage to stand unflinchingly by them led Thorpe to go back to the dentist, tell him about the physical examination and its results and ask what he could do to put his mouth into condition. The dentist replied somewhat as follows:

"Mr. Thorpe, this case is entirely outside the scope of dentistry as you and I were brought up to think about it. The condition in your mouth is not the result of anything that began in the mouth, and while it might be somewhat benefited or made more comfortable by local treatment, such treatment would not reach to the cause and could not possibly bring about a cure. The cause lies partly in your unbalanced habits of life, which you have now been forced to try to correct, but even more in what you eat and how you eat it. If I am to do you any good, you must be put on a diet that will bring you life instead of death.

"You have lived for years upon the regulation American diet of meat, potatoes, white bread, sweets and coffee. The unavoidable consequence of such a diet is cumulative damage to the intestinal tract and habitual constipation, and that lies at the foundation of all your troubles at the present time. You have come this far because your parents gave you a tremendously strong physique, and because your life has been clean and fairly regular, even if part of that regularity has been too much work and not enough play. If I'm going to do you any good, you'll have to eat what I direct. If you don't want to do that, you and I cannot play

together, but that needn't trouble you because there are at least a hundred good dentists in this city who will be glad to do what they can for you. I insist on having my way, not because it is my way but because I have found it successful in many cases more or less like your own. All your great executive ability, your knowledge of business and your power to make millions are of no value to you here. In this office I'm boss. Let us not begin until that is acceptable to you."

Thorpe went away grumbling at the surrender of his independence and the proposed restrictions, but later called up to say that he was ready to start on the dentist's terms. Two or three prophylactic treatments were given, a dietary program was outlined and at the end of the month a bill for service rendered was sent. No check was received and no word about it. At the end of another month the bill was sent again. Some days later the dentist, en route to his office one morning, saw Mr. Thorpe looking in a store window and spoke to him. The reply was much less cordial than Thorpe had formerly been and the dentist asked: "Why this sudden lack of cordiality? What has happened?"

"Well," said Thorpe, "if my secretary had gone to you for work, you wouldn't have sent her any such bill as you sent me."

"Probably not," said the dentist, "because it is improbable that she could afford the kind of service I am rendering you, but I'll tell you this, that if the service to her had been identical and her circumstances had been identical, the bill also would have been identical."

The next day a check was received from Thorpe with a request for another appointment. When he got into the chair, he said: "Now, let's get this matter straight. What do you want to charge me for everything you want to do for me?"

"I don't know," said the dentist.

"Then we can't do business," said Thorpe.

"That's all right with me," said the dentist, "but let me call your attention to this. A few months ago Mrs. Thorpe showed me a diamond brooch you had sent her from Chicago. I judge that you paid several thousand dollars for it. Are you a diamond expert and did you buy it on your own appraisal?"

"No."

"Of course you didn't. You went to a reputable dealer and took his word for the quality and the value. I have served your wife and daughter for ten years, and it has never occurred to you to ask an estimate or protest a bill. You know that I regularly serve at least a dozen of your intimate friends, some of whom are probably quite as wealthy as you yourself, and you first came here partly at the suggestion of one of them. I know you're sick or I wouldn't bother to talk to you like this. Suppose I charged you ten times my regular fee and got results. What difference would any amount of money I could charge you make to you if I benefited your health only a little instead of a great deal as I hope to? If you haven't confidence in me for a thing so small as money in your case, how could you have confidence about a thing so great as your life? If you

haven't that confidence, let's quit right now while we are on good terms."

That talk broke down his resistance. "Oh, shucks, Doctor, I must be as sick as you say I am to talk like that. I've known of you as a square shooter for twenty years. Anyway, the money doesn't make any difference. Let's get going."

They got going. The local treatments were repeated at intervals of two days for a while, then of three days, then of a week and, after some months, at intervals of two and four weeks.

His dietary regimen was revolutionized. Preceding every meal steps were taken to prepare his stomach for the reception of food. This was because many cases like Thorpe's are marked by a loss of appetite and by a deficiency in gastric secretions. The first step on the road back to health is to secure a return of normal appetite, which can be done only by ridding the colon of its putrefactive products and cleansing and stimulating the stomach. This result can usually be secured by causing the patient to take the juice of from two to six medium-sized oranges, with the pulp if the patient's condition permits, about 30 minutes before a meal or by taking hydrochloric acid under the guidance of a physician.

Just as Thorpe sat down at the table, the butler appeared at his side, bearing a small tray on which stood a single wine-glass which held a dessertspoonful of paraffin oil.

The first course, if the orange juice and oil are not counted, was some form of vegetable soup made in such way that the water in which the vegetables had been cooked formed the fluid of the soup. The menus for meals were varied in such way as to avoid monotony and loss of pleasure in eating. The general scheme was that foods should be chosen in such way as to build up his alkaline reserve, from the lowering of which he was suffering. This meant the entire elimination of meat and meat products and the use of very few cereals. In fact, those foods which showed a final acid ash were kept at minimum quantities. Whole grain bread was substituted for bread made with "refined" flour. Honey, maple syrup and coarse brown sugar or sorghum molasses replaced all refined sweets. Fresh, leafy, green-leaved vegetables supplied vitamins, mineral salts and cellulose. As a concession to his former habits he was allowed one cup of weak coffee per day on condition that he drink a pint of sweet milk or buttermilk daily to insure sufficient calcium and protein. Bran or agar was mixed with some of the food at each meal. Desserts were forbidden with the exception of dates, figs and raisins, perhaps with a very few nuts, finely chewed, almonds preferred.

Water-drinking and exercise formed two important parts of his recuperative program. His breakfast came at seven, his dinner at one and a light supper at six-thirty. Beginning about three hours after each meal, he was required to drink a glass of cool (but not cold) water every 30 minutes until time for the orange juice preceding the next meal.

The prescription for exercise was perhaps the most agreeable part to Thorpe of the new domination which had come into his life. He was a member of a golf foursome of long standing. All played about equally

well, so just to make it interesting, they regularly played for $100.00 a hole. Thorpe didn't care anything about the hundred, but he could not play with a prize in sight without an intensity of effort which could not be permitted. So the hundred had to be omitted. He was allowed to play until he felt the first symptom of fatigue, at which time he was required to stop, no matter where he might be on the course, and to take an orange or a glass of orange juice. At first he felt rather foolish sitting on a tee bench eating oranges, but he came to like it and so did his friends, so the caddies carried oranges as well as golf bags.

At 9.30 P. M. bedtime stories began for him with an orange or an apple and a glass of cool water. By 10 o'clock his bedtime stories were over and he was supposed to be cuddled down for the night and to stay cuddled until at least six o'clock the next morning. That is, he was supposed to get at least eight hours of sleep or rest. At first he rebelled, but, as his condition improved, he came to like it.

* * *

It was six years ago that John Thorpe sat looking out over his store at Peter Brown, with the letter before him saying that he might hope for three years of life if he would take along somebody who would spare him the "irritations usually unavoidable."

During that time his physical condition has slowly but steadily improved. For a long time he has been going the full eighteen holes in golf but at the sixth and twelfth holes some one from the clubhouse meets the foursome with orange juice for all and they sit and rest a bit and give some of the youngsters a chance to go through. Some of his cronies are beginning to do as he does about other things, and their "kidding" has an undertone of respect which was formerly lacking. And of course his family is delighted.

He has resumed a sort of supervisory control of his more important interests, but will never again enter the business world as he was in it. The old friendship with Peter Brown has been renewed and many a Saturday, when the links are full of young people, the two old duffers, in worn clothes, may be seen starting, perhaps with fishing gear, for the country in a ten-thousand-dollar limousine, driven by a chauffeur who manages to control his expression only because he wants to keep his job.

The dentist met Mr. Thorpe on the street recently, after he had been long away on a trip.

"Glad to see you back, Mr. Thorpe. How are you getting along?"

"Fine for me, but it's hard on my wife."

"How is that? I haven't heard her complain."

"Well, you see, we keep two cooks, and the meat cook doesn't think he's earning his pay unless he puts a roast as big as a nail keg on the table every day. The pastry cook can't fix my salads, and the meat cook doesn't want to and they won't let my wife in the kitchen, so we have a regular procession of new employees. We live in hopes of finding a regular fellow some day."

And then, as he turned away, he paused for one parting shot.

"Doctor, since you're doing me so much good, there's just one thing I can't pass."

"What's that?"

"An orange-juice stand."

"That may or may not be a good thing for you," replied the dentist.

"Wh—why, I don't understand. Didn't you tell me it wasn't possible to use orange juice to excess?" asked Mr. Thorpe.

"I told you just that Mr. Thorpe; also, that there was no article of your prescribed diet (with the exception of milk) more important than oranges—that both were most essential. When it came to orange juice, however, you were to take it without additions or subtractions. So, unless you know that the stands you patronize serve unsweetened orange juice, it may not be a good thing for you after all. You may be unknowingly getting the refined sugar which has been curtailed by your physician. You must be sure you take your orange juice straight.

"But how do I know? How can——?"

"That's easy," interrupted the dentist. "Ask the one who serves the drink, and if there is any doubt as to what you are getting, purchase your own oranges and with a sharp knife remove the outer oily portion and eat the rest, including the pulp and white outer covering, drink your glass of water and you have taken no chances."

"Thanks, Doctor, I'm glad you checked me up on the sugar. I was about to overlook it."

604 Medical Dental Arts Building

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE DENTAL DIGEST
at NEW YORK, N. Y.

Published monthly
for October 1, 1931.

State of New York, } ss.:
County of New York, }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Seeley Vander Veer, who, having been duly sworn according to law, deposes and says that he is the Assistant Secretary of The Dentists' Supply Company of New York, Publishers of THE DENTAL DIGEST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

NAME OF	POST OFFICE ADDRESS
Publisher, THE DENTISTS' SUPPLY CO. OF NEW YORK	220 West 42nd St., New York, N. Y.
Editor, GEORGE WOOD CLAPP	New Rochelle, N. Y.
Managing Editor, GEORGE WOOD CLAPP	New Rochelle, N. Y.
Business Manager, L. W. DUNHAM	New Rochelle, N. Y.

2. That the owners are:

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

THE DENTISTS' SUPPLY COMPANY OF NEW YORK.
SEELEY VANDER VEER, *Asst. Sec'y.*

Sworn to and subscribed before me this 17th day of September, 1931.

[SEAL] EMILIE S. SCHOPP
Notary Public, Westchester County
Certificate filed in New York County
Clerk's No. 1089, Register's No. 3-S-718. My commission expires March 30, 1933.

FUTURE EVENTS

THE EASTERN DENTAL SOCIETY OF THE CITY OF NEW YORK will hold its next regular meeting at the Allied Dental Council Auditorium, 425 Lafayette St., New York, on November 5, 1931.

Jacob Schneer, D.D.S., will lecture on *The Present Status of the Root-Canal Problem.* Alfred Walker, D.D.S., will give a discussion on *Root-Canal Therapy.*

Frederick Birnberg, D.D.S., will lead the Round Table Discussion.

A series of clinics covering the subject of *Root-Canal Therapy* in detail will be given by the following:

Irving P. Aaron	Samuel M. Frank
Harry Albert	Nathaniel Freeman
Ralph Howard Brodsky	Herman Gruher
Maurice Buchbinder	Joseph Kauffer
Moritz Cohen	Charles Ogur
P. E. Ellsworth	E. G. Van Valey

LOUIS LERNER, *President,*
HERMAN SPITZ, *Chairman, Executive Board.*

THE BALTIMORE COLLEGE OF DENTAL SURGERY DENTAL SCHOOL ALUMNI OF NEW JERSEY will hold a reunion and banquet at the Elks Club, Newark, N. J., November 10, 1931.

Kindly communicate with

BERNARD KNIBERG, *Secretary,*
138 Clinton Avenue, Newark, N. J.

THE ST. LOUIS STUDY CLUB OF DENTISTRY began its Fourteenth Annual Session on October 14, 1931, and will continue every second Wednesday thereafter, eliminating those too near the holidays. The subjects and schedule follow:

Classes. Dental Roentgenology; Crown and Inlay Casting Technic; Tooth Form, Cavity Preparation and Ceramics; Conductive and Local Anesthesia; Oral Diagnosis and Diseases of the Mouth; Oral Bacteriology; Dental Economics; Cast Partial Dentures; Anatomy of the Head; Public Speaking (special course).

Meetings. 1931—Nov. 11, 25; Dec. 9. 1932—Jan. 6, 20; Feb. 3, 17; March 2.

Particular attention is called to the change in class schedule. Meetings will be held every other Wednesday, instead of every Wednesday as in the past. This arrangement was made for the convenience of those dentists who have to come from towns outside of St. Louis.

THE EASTERN SOCIETY OF DENTAL ANESTHESIA will hold its next meeting at the Barbizon-Plaza, 6th Ave. and 58th St., New York, Friday evening, November 13, 1931.

A talk on *Comparative Methods of Nitrous-Oxide-Oxygen Anesthesia Administration* will be delivered by Walter Barry, of Newark, N. J.

Preceding the lecture there will be a dinner at seven o'clock.

Membership is open to all ethical practitioners subscribing to the Code of Ethics of the American Dental Association.

JOHN B. WOODMAN, *Secretary,*
57 West 57th St., New York, N. Y.

THE INDIANA STATE BOARD OF DENTAL EXAMINERS will meet in the House of Representatives Room of the State House, Indianapolis, Indiana, on November 16, 1931, at 8.00 A. M., for the purpose of conducting an examination of all applicants for licensure in Indiana who come with proper credentials and are accepted for examination.

All applications should be in the hands of the Secretary one week before the meeting. The examination will probably last four days. For applications, clinical requirements and other information, address

J. M. HALE, *Secretary-Treasurer,*
Mt. Vernon, Ind.

THE CONNECTICUT DENTAL COMMISSION will meet in Hartford, Conn., on November 16-19, 1931, for the examination of applicants for license to practice dentistry and dental hygiene and to transact any other business proper to come before it.

Applications should be in the hands of the Recorder at least ten days before the meeting.

For application blanks and further information apply to

ALMOND J. CUTTING, *Recorder,*
Southington, Conn.

THE WESTCHESTER DENTAL SOCIETY will hold its second scientific session at the Jewish Community Center, 122 South Broadway, Yonkers, N. Y., on November 17, 1931, at 8:30 P. M.

I. A. Levitt, of New York, will be the lecturer and will present a clinic on the technic of impression-taking and partial dentures with an elastic impression material. The lecture will be completely illustrated by motion pictures. Dr. Levitt will have on display also a line of models showing the accurate reproduction of undercut and margin.

Preceding the lecture, clinics will be given by L. Alexander, of New York, showing designing of partial dentures, and by M. D. Knower, of New York, showing a simplified method of using gold foil for fillings. There will also be a clinic showing the casting of porcelain and its uses.

All ethical practitioners are welcome.

MORRIS WEINBERGER, *President,*
30 South Broadway, Yonkers, N. Y.

GREATER NEW YORK DECEMBER MEETING

The Seventh Greater New York December Meeting for Better Dentistry will be held at the Hotel Pennsylvania, New York, N. Y., November 30-December 4, 1931.

The sessions will open at 2 P. M. on Monday, November 30th, with a joint meeting of physicians and dentists, which will continue through Monday afternoon and evening. The subjects to be covered are: (1) *Relation of Nose, Throat and Ear Diseases to Oral Diseases;* (2) *Relation of Obstetrics and Pediatrics to Dental Diseases,* and (3) *Relation of Internal Medicine to Oral Diseases.*

Admission to the regular sessions, which begin on Tuesday, will be by card only. At 9 o'clock each morning a practical talk will be given, followed by lecture demonstrations from 10 to 12. It will be necessary to make application for cards for these demonstrations.

Afternoon sessions on Tuesday will be confined to section meetings, on Wednesday to a symposium on *Practice Management* and on Thursday to topic discussions.

On Tuesday and Wednesday evenings scientific papers will be presented by members of the Chicago Dental Society, who are coming to New York in a group, at the invitation of the First and Second Dental Societies. Papers will be presented by:

Arthur D. Black	Frederick B. Noyes
M. D. K. Bremner	Edward H. Hatton
Charles W. Freeman	F. Blaine Rhobotham
John B. LaDue	Stanley D. Tylman
Howard C. Miller	R. C. Willett

On Monday evening a dinner will be given, which will be attended by both physicians and dentists assembled for the joint meeting.

On Wednesday noon a luncheon, which has been dedicated to children's dentistry, will be held in conjunction with the New York Tuberculosis and Health Association.

An exhibit by dental manufacturers will continue throughout the meeting, and Friday morning has been reserved for them for clinics showing the uses of their various products.

All members of the American Dental Association are invited to attend this meeting, and programs will be mailed to members in New York, New Jersey and Connecticut.

Members from other states may secure programs by addressing Miss Edith M. Davies, Executive Secretary, 2 East 103rd Street, New York.

JOHN T. HANKS, *Chairman,*
CARROLL B. WHITCOMB, *Vice-Chairman.*

THE OHIO STATE DENTAL SOCIETY will hold its Sixty-sixth Annual Meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, December 1-3, 1931.

This promises to be one of the outstanding meetings in the history of the Society. Every committee is working effectively and deserves the support of the entire State membership.

The Program Committee has secured the acceptances of such outstanding men as Martin Dewey, Arthur H. Merritt and C. F. Bodecker, New York; I. Wingate Todd and Weston A. Price, Cleveland; E. Blaine Rhobotham, Chicago; Carl Hoffer, Nashville; E. E. Bailey, Denver; Nathan Sinai, Ann Arbor. We are indeed fortunate in securing the services of these men for our program, and we feel that the different departments of dentistry will be thoroughly covered.

The Southern Society of Orthodontists is meeting jointly with us this year and has a very interesting program planned.

Let us all cooperate with the Reunion Committee in making the December meeting a gala occasion. There will be class reunions of Ohio State University Dental School, D. P. Snyder, Columbus, Chairman; Western Reserve Dental School, S. F. Hirsch, Cleveland, Chairman; Ohio College of Dental Surgery, H. C. Matlack, Cincinnati, Chairman; Cincinnati Dental College, R. B. Stevens, Cincinnati, Chairman. Graduates of these schools are urged to get in touch with their respective chairmen so that proper reservation can be made.

Make your arrangements now so that you can be in Cincinnati to meet all your old classmates.

EDWARD J. ROCHE,
Chairman, Publicity Committee,
453 Doctors Bldg., Cincinnati, Ohio.

THE MINNESOTA STATE BOARD OF DENTAL EXAMINERS will hold its next meeting at the University of Minnesota, December 11-19, 1931. For application and further information, address

WALTER H. SMITH, *Secretary,*
2337 Central Avenue, Minneapolis, Minn.

THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES will hold its Annual Meeting at the Palmer House, State and Monroe Streets, Chicago, December 21, 1931, at 4 P. M. sharp. The report of the officers will be given, a Board of Directors will be elected and such other business transacted as should come before the Association.

All members are urgently requested to be present.

By order of Board of Directors.

J. G. REID, *President,*
D. M. GALLIE, *Vice-President and Treasurer,*
E. W. ELLIOT, *Secretary.*

THE CHICAGO DENTAL SOCIETY extends a hearty and cordial invitation to all members of the American Dental Association and to members of recognized foreign dental associations to attend its Sixty-Eighth Annual Midwinter Meeting, which is to be held at the Stevens Hotel, Chicago, January 18-21, 1932.

The Program Committee, under the direction of Irwin G. Jirka, Chairman, is developing a comprehensive and diversified program which will challenge the attention and interest of every dentist in attendance, whether he is a general practitioner or engaged in specialized practice.

The Exhibit Hall will, as always, be a center of attraction and interest. All ethical manufacturers and dealers allied with the profession are invited to participate.

Please address all communications and application for space to the office of the Exhibit Committee, Chicago Dental Society, 185 North Wabash Ave., Chicago.

CHARLES R. BAKER, *President,*
HOWARD C. MILLER, *Secretary,*
185 North Wabash Ave., Chicago, Ill.

THE MINNESOTA STATE DENTAL ASSOCIATION will hold its Forty-ninth Annual Meeting at the new Municipal Auditorium, St. Paul, Minn., February 24-26, 1932. All members of the American Dental Association or recognized foreign dental organizations are invited.

L. M. CRUTTENDEN, *Secretary,*
435 Hamm Bldg., St. Paul, Minn.

THE KINGS COUNTY DENTAL SOCIETY is completing elaborate plans for the gala celebration of its Twentieth Anniversary to be held at Hotel St. George, Brooklyn, N. Y., February 25-27, 1932.

The various committees have obtained dentistry's foremost clinicians, lecturers and round-table discussors. A complete series of postgraduate lectures will be given, as in previous years. The academic schedule is to be concluded with a huge social affair, a dinner-dance, in the main ballroom, with its beautiful colorama, of the Hotel St. George. Professional entertainers, better than ever before, are being secured.

A cordial invitation is extended to every ethical dentist to join in this happy celebration. Watch for further announcements.

MATTHEW D. LEVIN,
Chairman, Publicity Committee,
201 Eastern Parkway, Brooklyn, N. Y.

THE DENTAL SOCIETY OF THE STATE OF NEW YORK will hold its Sixty-Fourth Annual Meeting at Hotel Ten Eyck, Albany, N. Y., May 11-13, 1932. A cordial invitation is extended to all members of state societies, Canadian societies and ethical dentists.

The officers and committees will present a program which we trust will enlist the attention of all dental practitioners.

H. J. Burkhart, 800 East Main Street, Rochester, N. Y., is Chairman of the Program Committee; E. W. Briggs, 1118 Madison Avenue, Albany, N. Y., Chairman of the Exhibits Committee; and Dr. E. Hurley, 80 Fourth Street, Troy, N. Y., Chairman of the Clinics Committee.

For further information, address

A. P. BURKHART, *Secretary,*
57 East Genesee St., Auburn, N. Y.